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NOTE.—Communications relative to the editorial management should be addressed to Mr. ROTHWELL. The articles written by Mr. Raymond will be signed with a star.

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International Coinage.

DR. F. A. P. BARNARD, the President of the American Metrological Society, has addressed a memorial to Congress, advocating what seems, and has always seemed to us the only practicable scheme of international coinage, viz. : the preparation of coins of metrical weight and uniform fineness (nine-tenths), and the securing of legislation and treaty stipulations by which such coins shall become legal tender, according to their weight. As Dr. BARNARD said in his letter to the International Congress of Geneva, in 1874, "Let the new coins be issued without any other denominational stamp but their weight in grammes, the reverse being distinguished by any suitable device of general significancy, and there can be little doubt that they would soon be received with favor, and employed in local transactions interchangeably with those of the local coinage."

The unit of this coinage would be the gramme of standard gold, and a 10-gramme piece would be worth a little over $5.98, or 24s. 6.984d. sterling, or 29.052 francs, or 25.234 marks, or 8.411 Prussian thalers. It could practically circulate, therefore, as $6, or £1 4s. 7d., or 29 fr. 1 sou, or 25¼ marks, or 8 thalers 12 silbergroschen, the variation from the true value either way being less than ½ of one per cent. The progress of the international coins in public favor would be, as that of the metric system itself has been, a matter of time ; and it would vary in different countries. But some countries have a metrical coinage already, like Japan and the Argentine Confederation ; and the United States might easily possess one. In these cases, the circulation of the international coins would be a matter of prompt acceptance. Such a coinage, besides affording a convenient international unit of value—namely, the gramme of standard gold, would educate the people more rapidly than anything else to familiarity with the metric units of weight and (the coins being metrical in diameter also) of measure.

*

The Consolidation Coal Company.

OUR review of the apparent policy of this Company towards its neighbors in the Cumberland field, and the figures from which it appears the Company actually loses money on its coal business, have, it seems, attracted much attention among the stockholders of the Company.

Our limited space prevents our giving as much attention to the subject at this time as it deserves, but we cannot refrain from noticing a recent circular (January 26th,) addressed to the stockholders by *three* out of *ten* of the directors, asking for proxies to re-elect Mr. CAMPBELL to the presidency of the Company. So far as Mr. CAMPBELL personally is concerned, we have nothing to say. He has always borne the reputation of an upright gentleman and an able executive officer, but the supposition that either he or any other man, however able he might be, could discharge efficiently the onerous duties of two such exacting positions as Commissioner of Public Works of the City of New York, and President of the Consolidation Coal Co., seems almost too preposterous to be seriously considered by practical business men ; yet the circular referred to proposes to do this. This circular also makes some statements as to the results attained under the present (Mr. CAMPBELL'S) administration of the Company, which are by no means supported by the published reports of the Company.

These statements are as follows :

"In the year 1875, just closed, the net earnings, after reducing the debt $78,000, through the operation of the Sinking Fund were $508,000 or five per cent. upon the Capital. During the four years of Mr. CAMPBELL'S administration (1872 to 1875) the funded debt has been reduced $346,000 and the company relieved of all floating debt.

"The simple statement of these results is a sufficient warrant for a continuance of the same policy and management. Many improvements and economies have been, and still are being introduced : New mines have been opened—underground transportation by steam has been inaugurated—the railroads have been, in good part, relaid with steel rails, and otherwise greatly improved—the rolling stock has been increased and renewed, and supernumerary officers and employees have been dispensed with."

With regard to the reduction in the floating debt here claimed, it would appear from the President's (C. H. DALTON'S) report, dated Dec. 31, 1871, that after paying a dividend of 4 per cent., the *surplus* (not debt) was placed approximately at $126,741.73. And we were informed after the books were made up that the exact *surplus was* $172,034. Where then was the floating debt that the present administration paid off?

As to the *funded debt* the circular claims that $346,000 has been paid off. We see no evidence anywhere that any funded debt has been paid except that called for and required by the terms of the mortgages, under which that class of debt was incurred, and there is usually but little special credit given to any one for paying his notes at maturity.

During the preceeding (Mr. DALTON'S,) four years' administration the bonded debt was increased $800,000. During Mr. CAMPBELL'S administration a bonded debt of $1,250,000 was authorized. Of this amount $750,000 were reserved in the hands of trustees to protect other existing bonded debts, and of the balance $500,000, we know that more than one half was sold, at say 70 per cent., previous to Jan. 1874, or two years ago.

So far as a comparison of results attained form a basis for the continuance in power of an administration, that of Mr. DALTON seems to have deserved better than the present one.

In 1868, the company was almost bankrupt, its notes vainly seeking takers in Wall street. From the report of Jan. 1872, when the present administration came into power, it appears that, in the previous four years, 28 miles of iron and 18 miles of steel rails had been laid, 5 new engines, and many new cars had been constructed, new tracks and branch lines built at a gross cost of $444,570, all of which had been charged to current expenses, and after $555,000 had been paid in dividends the company was left in sound financial condition. The reports of the present administration show that, in 3 years, 1872 to 1874 inclusive, the improvements, for which so much credit is taken in the circular referred to, amounted to $228,788.05, so that it would appear that the five per cent. dividend declared should be credited rather to the preceding administration than the present. Yet we have heard no one suggest its instalment on that or any other ground.

We have intimated in a former article that there is even now room for the exercise of greater economy in the management of this company ; for we showed —so conclusively that the company has not questioned the correctness of our figures—that the company carries on its mining at an absolute loss, and yet opposes the adoption of the most important measures aiming at reducing the cost of production. Yet we find special credit taken for "dispensing with supernumerary officers," which, we presume, must refer to Messrs. MACKIE and SLACK. The former of these was Vice-President of the company, we believe from its organization for 12 years, to whom, on his retirement, Mr. CAMPBELL referred "with thanks for faithful and efficient service," and whom we have always heard spoken of in flattering terms by those having business relations with him during his connection with the company ; while Mr. SLACK, the late Superintendent of the company's railroad, also enjoys the reputation of having been a faithful and efficient officer. It may be that these officers were "supernumerary"—we know nothing about that—but they were, at all events, according to Mr. CAMPBELL and public report, "faithful and efficient," and it is to be regretted that when the spirit of economy had taken possession of the administration it should have stopped with "dispensing with" unexceptionable, though possibly "supernumerary" officers.

We do not wish to have our remarks interpreted as, in any sense, advocating or opposing any individual interests. We believe the present policy of the Consolidation Coal Company has done, and is doing, a serious injury to the interests of the Cumberland Coal trade ; and, thoroughly informed as we are of the effects of this policy, we believe it to be to the interests of the Consolidation stockholders that a different one be adopted. Though we are not advised of the views of the directors of the company, we note the fact that *six* out of *ten* have issued a circular asking for proxies to be used in electing a new administration ; it would seem, therefore, that a large majority of the directors—all, we believe, successful *business* men—are dissatisfied with the present administration. Let us hope that if a new administration be elected, as seems probable, it will adopt a policy free from some of the blots we have pointed out in that of the present one.

The Mindeleff Process.

THIS process is said to be attracting considerable attention in San Francisco. It is set forth briefly in the specifications of United States Patent, reissue No. 6,509, and more fully in a report dated November 22, 1875, and signed by Messrs. JAMES R. SMEDBERG and E. N. ROBINSON, Engineers, of San Francisco. The former of these names we take to be that of an eminent gas engineer ; the latter is not known to us—but that may as well be due to our ignorance as to Mr. ROBINSON'S obscurity. We infer, not from our knowledge or lack of knowledge concerning these gentlemen, but from the contents of their report, that they are not practical metallurgists, and that this is their first essay in metallurgical literature. Concerning Professor MINDELEFF, we know nothing. Perhaps he would not willingly be held responsible for the statements of this report, which we will now proceed to analyze.

The authors say that "the process is based on the fact that hydrogen unites powerfully with oxygen and sulphur *in statu nascenti*, and that gaseous carbon possesses even greater power to eliminate these and other impurities." On this principle, Prof. MINDELEFF seeks to substitute light carburetted hydrogen for pure hydrogen, long used as a reducing agent in the laboratory, and claims that this light carburetted hydrogen "is actually a more valuable reducing agent than simple hydrogen, at equal cost of production for each." Several calculations are given, to show how many pounds of certain metallic oxides may be reduced by 1.000 feet of carburetted hydrogen ; and the declaration is

repeated, that "the gaseous carbon has, in the first place, as great power to deoxidize the metals generally as hydrogen itself, while it reduces certain of them which are utterly refused by hydrogen." The authors add: "In the case of ores containing sulphur, the hydrogen will take some portion of this metalloid and produce sulphuretted hydrogen, while the carbon will escape with the rest in its clutch as bisulphide of carbon."

The apparatus based on these principles consists "essentially of but two parts, viz.: a retort kept at a red heat for reducing the ore, and a decomposing chamber for converting coal-gas into light carburetted hydrogen by depositing the excess of carbon, which would otherwise coat the ore and interfere with its reduction." Ordinary illuminating gas, taken from the street mains, is passed through the decomposing chamber and into the retort, where it reduces the heated ore—sulphurous acid, sulphuretted hydrogen, carbonic acid, water-vapor, arsenic vapor, arseniuretted hydrogen, antimoniuretted hydrogen, etc., escaping through a suitable waste-pipe, while "all impurities which render an ore rebellious, under usual methods of treatment, are either completely eliminated, or so far reduced in quantity and modified as regards their combination as to be readily handled by the final processes of smelting and refining."

This portion of the report scarcely bears the tone of an impartial inquiry. These sweeping assertions would be far more appropriate to an anonymous prospectus or an avowed advertisement. We pause for a moment to examine the propositions thus laid down, in words which we have either quoted precisely, or given, with all possible fairness, in substance.

The reducing action of hydrogen or hydro-carbons is not denied; nor was it discovered by Professor MINDELEFF. The superiority of any hydro-carbon over pure hydrogen at equal cost may very well be doubted; but the cost of pure hydrogen puts it out of this question, and we can afford to let the Professor's discovery on that head pass for the present unchallenged. The alleged performance of gaseous carbon on ores containing sulphur—walking off with the latter in its clutch as bisulphide of carbon—may also be disregarded; since, as will be seen below, the inventor does not quite trust the clutching of sulphur to gaseous carbon, but prefers to clutch it himself, by a preliminary process of roasting. Finally, the treatment of ore in a retort is not so simple a matter as the distillation of gas from coal. Mr. SMEDBERG'S ample experience as a gas-engineer, unfortunately, does not acquaint him with the difficulty of securing complete reactions by means of gas throughout a mass of material; and he does not seem to be aware that he will have to use a large excess of gas, to say nothing of mechanical means for stirring the charge, to secure such a result; while the impurities which are imagined to go obligingly up chimney will be awfully apt to stay, and some other matters, to which we shall presently call attention, will stay also, much to the disturbance of this neat theory. To sum up the question thus far: Professor MINDELEFF proposes to employ light hydro-carbon as a reducing agent. Such it undoubtedly is; we think its application will be found difficult in practice; but, aside from its cost, it does not seem entirely impracticable. In suitable apparatus, gas may, we think, be used to advantage for metallurgical purposes; but the best gas for the purpose is carbonic oxide; and if Mr. SMEDBERG will turn his attention to that subject, he will find that he can do better with his coal than turn a part of it only, first into illuminating gas and then into light hydro-carbon.

But we now come to the practical proofs of the usefulness of the MINDELEFF process offered in this report, and the comparison drawn between it and the ordinary smelting methods. At the first step, the authors confine themselves to the treatment of copper ores, and of these, to the single class of oxides or carbonates. We do not know what the inventor claims; but they say: "It must be borne in mind that the MINDELEFF process pivots upon an oxidized condition of the ores. It contemplates ores which either are naturally oxidized, or have been artificially subjected to an oxidizing roasting. Thus its action is perfect upon any class of original ores. The old way considers all ores as sulphides—the new, as oxides." The "old way," thus summarily disposed of, considers no ores as sulphides unless they are sulphides; and the Professor will have to do the same. Even after roasting—particularly a cheap roasting—he will find an amount of sulphide in his charge that will kindly but firmly decline to be considered as oxide, or to behave as such.

But we shall recur to the question of pyritous ores presently. The essay before us furnishes as a test case only the treatment of pure, rich natural carbonate; and the authors say that enormous deposits of such ores are available for treatment at San Francisco. They say that these ores assay from 200 to 1,200 pounds of copper per ton, while the sulphides, important as they are, are poorer in metal, and occur at greater depths. We presume they refer to the average grade of the Copperopolis ores; and we need only caution them against comparing the figures obtained from large quantities of the latter with estimates from limited quantities of the Battle Mountain and other carbonates. Rich oxidized ores, like any other rich ores, are obtained, as a general rule, in one way only, viz.: by picking them out and throwing away a larger quantity of low-grade material. That this increases the cost of mining, we need hardly tell citizens of the Pacific slope.

The test reported was the treatment of a charge of carbonate, containing 32 per cent. of copper. This was heated for half an hour (steam and sulphurous acid escaping "copiously"), and then the gas was turned on, when the flow of steam recommenced with great vigor, being due this time, not to the moisture of the charge, but to the union of hydrogen with the oxygen of the ores. Simultaneously with the surrender of oxygen, sulphuretted dydrogen and the vapor of bisulphide of carbon were given off; and at a later period, as the steam fell off, the volume of these two latter foul gases increased," and the flame of carbonic oxide appeared. At the end of two hours the flame at the test-burner on the escape-pipe showed the brilliant yellow of uncontaminated coal-gas, and the charge was withdrawn. The ore had been charged in lumps, up to 3 or 4 inches diameter, and the lumps, when withdrawn, showed throughout threads and globules of "absolute metal." Messrs. HUHN and LUCKHARDT (good authority) certify that the ore, being in lumps, could not be sampled properly before treatment, but that a fair sample selected by the eye contained 0·6 per cent. of sulphur, while a sample selected after treatment contained 0·17 sulphur, 0·67 copper as sulphide, 0·27 copper as oxide, and 54·26 metallic copper, showing that 98·29 per cent. of the copper had been reduced to metal. These analyses, and "the verdict of the escape-pipe," the authors claim, are conclusive, as to the efficiency of the process. But the verdict of the escape-pipe is curiously at variance with the analyses. According to the latter (assuming them to be correct as averages) this ore contained six-tenths of one per cent. of sulphur before treatment, and seventeen-hundredths afterwards. Hence the amount of sulphur removed was less than half of one per cent.; yet that wonderful escape-pipe began emitting sulphurous acid right away, before ever the gas was turned on, and followed it up for an hour and a half with sulphuretted hydrogen, and the vapor of bisulphide of carbon. After the oxygen was nearly all gone, the volume of these foul gases actually increased. Did ever the half of one per cent. of sulphur accomplish so much through an escape-pipe? Evidently there was no quantitative test made of the escaping gases, and no qualitative test worthy of the name; for although the ore was a carbonate, and all the carbonic acid was necessarily expelled by its calcination, this gas is not mentioned at all.

To sum up this test, then, we find that the weight of the charge before or after treatment, the amount of gas employed, the quantity of coal consumed to make the gas, exact tests of the nature of the ore before treatment and afterwards, and the description of the further steps for the production of merchantable copper—are all wanting. The test proves that copper carbonate can be reduced effectively at red heat by marsh-gas—and that is all.

Thus far, the report is generally fair, though inconclusive. But the next paragraphs are scarcely fair. We are gravely assured that if smelted in the "old way," the carbonates would yield as products matt and slag, and that the labors of the copper-smelter would be but just begun; and a list of ten successive operations is given as necessary by "the old way," whereas the MINDELEFF process requires but three, or (including the preliminary roasting of pyritous ores) four. The three steps are: the reduction already described; smelting the reduced ore; and finally the parting and refining of the product. The roasting of sulphides is to be performed with extraordinary rapidity and cheapness by a new method.

But has it not occurred to these gentlemen that copper pyrites contains about as much iron as copper, and that their reduction of any ore containing iron will leave iron-sponge in the mass, as well as metallic copper? We will say nothing of the arsenide of copper, or a possible alloy of nickel, etc. On any other than pure oxidized copper ores, their reduced product will be harder to handle than the original ore; and they will have to add sulphur to it, and do just what the "old way" did, to eliminate such impurities. The presence of iron ore in their oxidized copper ores will defeat their simple plan, and require a complicated one.

But the long category of operations quoted in this report as necessary by present methods is, as the authors candidly tell us, "practiced at Swansea." They do not add that these operations are practiced on impure ores; and that nobody in his senses, if supplied with an abundance of pure, oxidized ores only, would dream of putting them through such a series of operations.

What then, is "the old way" of smelting oxides or carbonates of copper alone? They are simply reduced in the cupola furnace to black copper, at one operation. We have known this to be done with the impure "black oxide," such as occurs in Virginia and Tennessee, so that 96 per cent. of the copper in the ore was at once obtained in the black copper, which was itself composed of 90 per cent. copper and 10 per cent. iron. This was then refined by a single further operation. After a careful study of the MINDELEFF process as here described, we confess that it seems to us to go much further and fare much worse. For it must be remembered that in the direct smelting of oxidized copper ores the presence of iron oxides is not injurious, but positively desirable. They pass chiefly into the slag, preventing the loss of copper as silicate. But the presence of metallic iron sponge in the MINDELEFF reduced ore is a different matter altogether. It will hinder the subsequent fusion, and it will make a very poor black copper, which may need further treatment before it will be fit to refine.

We have thus gone patiently through the statements made in favor of this process; because we had reason to think its advocates sincere and intelligent, though uninformed as to the actual present state of the art of smelting copper. We think they can appreciate plain, straight forward criticism; and we have given it to them. We might add some words as to the estimate of cost and profit with which their report concludes; but space will permit us to note only that they put the cost of *smelting and roasting* at $3.50 per ton, which is a little over one-third of the inevitable cost of smelting alone; that they have allowed for no excess of gas, but on the other hand, propose to reduce 9,408 lb. of copper with 10,000 feet of gas, though their own previous calculations show that

if the compound is not protoxide, but oxide (as it is in all natural carbonates) 10,000 feet of gas will reduce, even theoretically, but 6,800 lb. of copper; and finally, that they allow for no losses whatever, either in reducing, melting or refining. Their gas is to cost but $1.50 per thousand feet, which leads us to exclaim most fervently that if we could buy illuminating gas at that price in this neighborhood, we would have a much better use for it than Professor MINDELEFF's process. We trust that our companies in New York will come to that, some day; and, to secure such a result, we could cheerfully resign ourselves, so far as copper-smelting is concerned, to peg along yet awhile in "the old way."

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Existing and Proposed Import Duties.

THE following is a comparison of the existing import duties on articles of the most interest to our readers, with those proposed by Mr. MORRISON's bill, now before the Committee of Ways and Means:

	Existing.	Proposed.
Flat Iron, not less than 1, nor more than 6 inches wide, nor less than ¼, nor more than 2 inches thick. *Round Iron*, not less than ¾, nor more than 2 inches in diameter, and *Square Iron*, not less than ½, nor more than 2 inches square per pound	1 c.	½c.
Flat, Round or Square Iron, of larger or smaller sizes than the above mentioned, per lb	1½c.	1 c.
Provided, that all iron in slabs, blooms, loops, or other forms, less finished than bars, and more advanced than pig iron, except castings, shall pay the same as iron in bars.		
Provided, that none of the above iron shall pay less than	35 p. c.	½c.
Railroad Bars—Iron, per 100 lb	70c.	$10.*
Railroad Bars—Steel, per 100 lb	$1.25	$15.*
Boiler plates, or other plate iron not less than 3-16 of an inch thick, per lb	1¼c.	1¼c.
Scrap Castings per ton	$6 00	$4 00
" *wrought* " "	$8 00	$6 00
Pig Iron per ton	$7 co	$5 00
Iron ore	20 p. c.	
Antimony crude or regulus	10 p. c.	free.
Copper Ore—On all fine contained therein, per lb.	3c.	
Old Copper, fit for manufacture only, per lb.	4c.	2c.
Copper, pigs, bars, ingots or plates, per lb.	5c.	2c.
" sheets, bolts, nails, spikes, rods, pipes, &c.	45 p. c.	
Tin, in bars, blocks or pigs, and grain tin	free.	
Tin Plates, or sheet, and terne or taggers tin	1 1-1cc. per lb.	
Lead—Bars or pigs, per lb.	2c.	1c.
Old lead, for manufacture only, per lb.	1¼c.	1c.
Pipes, shot and sheets, per lb.	2¾c.	2c.
Zinc, in blocks or pigs, per lb.	1½c.	
" in sheets, per lb.	2¼c.	
" manufactures of	35 p. c.	
Quicksilver	free.	
Anthracite free, *Bituminous*, per ton of 28 bushels, 80 lb. to the bushel.	75c.	free.
All *slack*, or *culm*, such as will pass through a half-inch screen, per ton of 28 bushels, 80 lb. per bushel	40c.	free.
Not otherwise provided for, per ton	4c.	free.

* Per ton (2240 lb.)

Iron and Carbon, Mechanically and Chemically Considered.

CONTINUED FROM PAGE 109.

ALL the samples below a density of 7·124, inclusive, except No. 6 C. F., were graded as 3d class guns of poor metal; Nos. 9 and 7 F. P. F. and 131 C. F. are 2d class, and all the rest 1st class metal. The iron in all approaches comparative uniformity as to general properties, being cold blast charcoal iron cast to undergo a certain proof. Let us classify the samples by their specific gravity into divisions at intervals of a specific gravity of 0·05.

AVERAGES OF PRECEEDING TABLE: TAKEN IN CLASSES AT INTERVALS OF 0·05 SPECIFIC GRAVITY.

No.	Specific gravity.	Tensile strength.	Average graphite, per cent.	Ave'ge Combined carbon, per cent.	Average Silicon, per cent.	Average sulphur, per cent.	Average phosphorus, per cent.	Average manganese, per cent.
1	7·030	18,546	3·10	0·50	1·15	....	0.90	....
2	7·080	20,592	2·85	0·87	1·12	....	0·70	2·14
3	7·126	21,227	2·57	0·71	1·17	....	0 75	2·93
4	7·173	24,541	2·35	1·35	0·76	....	0·65	2·42
5	7·215	29,525	2·06	1·93	0·65	....	0·55	2·59
6	7·234	29,854	2·01	1·98	0·97	....	0·39	1·98

We now see two facts clearly proved; first, that the tenacity, and second, that the density of cast iron increase directly as the amount of combined carbon present. The amount of silicon is small, as might be expected from the character of the metal and its mode of manufacture. It is evident from the analyses of the samples with density 7·220, that silicon, in this amount, has small effect on the tenacity. The phosphorus also diminishes, as the tenacity rises, while the manganese remains; other things being equal, the less phosphorus the stronger the iron, but here the diminution is too small to affect the qualities of cast iron in any marked way. Hence it is evident, that the carbon alone causes the change in quality, though, without doubt, the elimination of silicon and phosphorous is an advantage. The total amount of carbon remains nearly constant, but the combined carbon increases fourfold, the graphite diminishing correspondingly, and regularly. The use of white grades of iron sufficiently explains the increase of 0·39 per cent. in the total carbon, since these grades contain somewhat more carbon than others.

Messrs. BOOTH and MORFIT are entitled to the credit of first estimating *slag* in cast iron. Its presence is of scientific interest, but it may become an important element in reducing tenacity, as is shown by the behaviors of No. 225 F. P. F. which contains 1·15 per cent., and has a tenacity of 13,399, or the lowest on the list. The original silicon of the iron was, doubtless, converted into slag, during the remelting or refining of the iron.

The samples, Nos. 322, 325, 301 and 225, are hot-blast iron, containing, as above, an average of 2·92 per cent. graphite, 0·76 per cent. combined carbon, 1·59 per cent. silicon and 0·49 per cent. slag; their average tensile strength is but 19,640 with a density of 7·065. These facts, and the results of the endurance of the guns, were, doubtless, the cause of the prejudice so long prevalent against hot-blast iron, for many purposes. Our earlier furnacemen, however, followed a blind rule of thumb. But now, by using brains, the charge can be so mixed, and the shape of the furnace so controlled, that hot-blast iron can be made identical in composition with cold-blast iron, and superior in the tenacity of the pigs themselves to the excellent cast iron described above. Commander L. A. BEARDSLEE, of the Washington Navy Yard, states* that tests made under his direction on pigs, produced by the Muirkirk Iron Co., gave the following results. The test-bars were turned direct from the pigs. The iron was made with hot-blast and charcoal out of the Tertiary carbonate ores, on the Western shore of Maryland.

MUIRKIRK FURNACE PIG.

Grade.	1st Test.	2d Test.	3d Test.	4th Test.	5th Test.	6th Test.	Average.
No. 2	20,817	22,178	21,113	22,297	....	....	21,601
" 3	22,454	25,493	22,316	25,572	....	....	23,959
" 4	47,756	40,193	42,166	40,311	39,712	37.840	41,329

The density of No. 4 iron was, in sample 1, 7·3251, and in sample 2, 7·3467.

This iron is fully equal to the Kent and Greenwood cold blast irons described above, and I believe that a tenacity of 47,756 is the highest ever recorded of pig or cast iron. The grades are peculiar, No. 4 being close grained, light gray iron, not mottled, and with a slight white rim on the outside.

The preceding facts have shown the great influence of carbon in modifying the physical properties of pig iron. But a still more remarkable proof of the influence of carbon is given by the effects of its combinations in steel. I append an original table of the classification used for Bessemer steel at Neuberg, in Styria. The scale of grades was established by PETER TUNNER, on the basis of the Swedish; but he added, for greater accuracy, two subgrades to each number. In the last two columns I add the carbon percentage and specific gravities of the grades, into which Bessemer steel made at Turrach, in Carinthia, is divided.†

CLASSIFICATION OF BESSEMER STEEL.

No.	Grade.	Per cent. Carbon.	Tenacity, Lb. per sq. inch.	Tenacity, of grade.	Carbon by S. A. FORD. Eggertz.	Carbon by S. A. FORD. Ammonium. Double Chloride.	Turrach Steel. BUCHAN. Sp. gr.	Turrach Steel. BUCHAN. Carbon. per cent.
18	7 soft.	0·05	57,500	57,500	0·14			
17	7	·12	62,000	to	·16	.....	7·8718	0·11
16	7 hard.	·16	65,500	69,000	·19			
15	6 soft.	·22	69,000	69,000	·31			
14	6	·28	73,500	to	·17	.....	7·8358	0·53
13	6 hard.	·36	78,000	80,000	·35			
12	5 soft.	·42	82,500	80,000	·32			
11	5	·50	92,000	to	·42	.....	7·8562	0·72
10	5 hard.	·58	100,000	103,000	·47			
9	4 soft.	·67	105,500	103,000				
8	4	·75	113,500	to	·56	.....	7·8476	0·85
7	4 hard.	·83	123,000	126,000				
6	3 soft.	·92	131,000	126,000				
5	3	1·00	137,500	to	8·12	0·82	7·8279	1·15
4	3 hard.	1·08	147,000	149,000				
3	2 soft.	1·17	155,000					
2	2	1·25	not de-		1·20	1·24	7·7913	1·35
1	1	1·50	term'd.					

It seems to me that BUCHAN's determinations of sp. gr. are not entirely accurate; they were made on rolled bars. The Neuberg scale was of course fixed on rolled steel.

Here, in seven grades, we have eighteen varieties. But it is said that such an enormous number is of no use, and again that, even if advisable to sort so accurately, the character of the different grades would vary so little that they would not be easy to distinguish by practical tests.

Now, supposing you were a cast steel maker, and got an order (an ordinary one) for a "bar of steel;" you heard, on inquiry, it was "for a railroad," but nothing else. On sending the bar you heard it did not do so well as it ought. I am telling you what has actually taken place. By this education one soon learns that a "bar of steel" is an expression no more definite than the famed one as to the "size of a piece of chalk." A railroad, for instance, uses crowbars, spiking hammers, tyres, tap and die steel, machinery steel and tool steel, say seven kinds of steel in ordinary use in the shops, and an eighth as rails in the track. Either of these kinds is unfit for the purposes to which the others are applied, and the harder kinds would be injured by the treatment to which the softer ones are subjected.

This injury is a matter of ordinary occurrence and of great loss and annoyance. But so long as the cast steel maker divides his steel *by name* only into ungraded classes, the smith will be at liberty to experiment, and will certainly not have the opportunity of deciding exactly what steel he wants. I believe, from experience, that cast steel graded by names varies far more than the makers at all believe, and I think it correct to assert that there is money, safety, and reputation for cast steel makers in the EGGERTZ test. This test is most thoroughly applied in Bessemer works, and by recent improvements in apparatus it is easy to make 150 tests a day

The chemical test is a decisive one of course, but a good smith can readily learn to sort steel even into these eighteen grades. He has strength, hardness, both natural and produced by hardening, and temper to judge by, three qualities which vary greatly in the different grades of steel. That a smith does readily learn I shall show you in two ways. At Neuberg, in 1866, a smith, who had been working on carriages for field guns, was selected to test the steel in regular course of manufacture, and at that time no Eggertz test was used, except in special instances. I got from the smith a series of bars representing all grades soft and all grades hardened. I have had the carbon estimated in the soft bars by Mr. S. ALFRED FORD with the results appearing in the sixth and seventh columns of the table. Now these bars were graded at the anvil from a lot of small bars an inch square, previously drawn out in a merchant train from small test ingots. You see he has erred seriously only in Nos. 14 and 15, and this may be a transposition when he numbered his bars and has graded the rest, at least, in the proper order. No especial care was observed by the smith, it being a matter of ordinary grading. But I can also show you how the strength of the bars graded by the same smith in regular work agreed with the limits previously fixed.

TO BE CONTINUED.

* Bull. Am. I. and S. Assoc. 1875. p. 205.

† MAX BUCHNER. *Berg- u. Hüttenmännische Zeitung*,

On Furnace Hearths.*

By GEO. ASMUS, New York City.

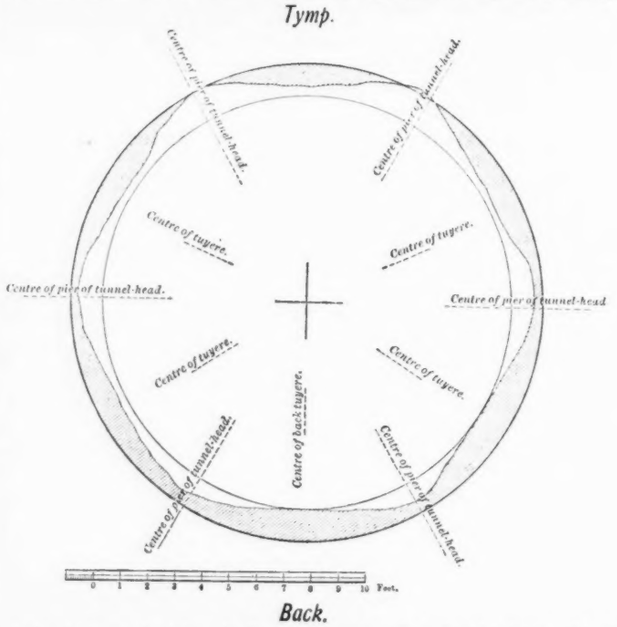
CLOSED front, or open front for blast furnaces, is, since a number of years, a much discussed question among the furnace-men in every country where iron is made. As blast furnaces are important institutions, and as the whole question is one of economy, I hope to be excused if I enter a little into the details.

The "fore-hearth" is a prolonged opening in the lowest part of the hearth, from two to three feet wide, four to six feet long, and from two to three feet high. It is a more or less fire-proof box, cooler than the inside of the hearth, and is apparently made for the purpose of letting the cinder out. Its front is closed by the "dam," *over* which the cinder runs and *through* which the iron-cast takes place. As no iron is made in this part of the furnace—it being below the range of blast—and as it forms in most cases a source of daily work and sometimes the cause of most serious troubles, it is interesting to see why this thing was made at all. In olden times the furnaces had no fore-hearth; a vertical slot, a few inches wide, was cut into the front hearth-stones, reaching to the bottom, and iron and cinder was tapped through the clay which closed it. Then furnaces were called *Blauöfen*—also Blaseöfen—Blow-furnaces; and up to the present day some of those metallurgical relics have withstood the pressure of our fast times. They are in the remote mountains of Steyermark; charcoal furnaces, which make every day hardly a few tons of excellent iron. But a time came, when men were no more satisfied with those little smelting pots, into which a gentle stream of air was blown through one nozzle, which received its scanty supply from a leather bag, squeezed by some tired water-wheel. Larger dimensions, more tuyeres, higher pressure, finer steam engines and hot blast produce more iron and more cinder. Soon the tapping-slot in front got too hot; it was washed by the cutting fluids and the natural move was: to get farther off from the hearth. The slot became a prolonged outside bar, in which the cinder could rise—forming a communicating pipe with the hearth. But this part fills up not only with fluid, iron, and cinder; but coal and half-smelted ore float into it and, as the blast is intercepted, no combustion and no fusion can here take place. So this ore and coal become rubbish, and often of a dangerous kind. Cast-iron clings to it, and, after the tap is made, enough air blows upon it to effect a partial puddling, and there results a tenacious mixture of all kinds of steel and wrought-iron, which paste the whole pile together. To prevent this the fore-hearth has to be cleaned out, and that is what the smelters call *working the furnace*. A superstitious idea had come about, that some incomprehensible, but very bad, matter lay hidden in all smelting material, which crept slyly into the fore-hearth, where it was caught and kicked out. During this purifying process, of course the blast had to be stopped; and the more industrious and faithful the smelter the more thoroughly he did his work—and the longer the furnace stood still. So it was, up to eight years ago, everywhere, and so is it still at a great many places. The loss of time by stopping the blast amounts from two to four hours out of every twenty-four.

The honor to have broken this practice is due to FRITZ LURMANN, one of the most able blast-furnace engineers in Germany; and eight years ago I commenced, in connection with him, to bring his simple innovation—the closed front—before the iron men of America. LURMANN'S idea can be expressed with a few words: The fore-hearth is only made to get rid of the cinder; it is a troublesome, additional construction, which has nothing to do with the smelting process proper at all; let us cut off this fore-hearth completely and tap the cinder through an opening just wide enough to suit the purpose, but which cannot burn out. It must be done by a water-cooled casting. This has to be a foot, or so, below the range of the tuyeres, and may be put in any part of the circumference of the hearth, wherever it seems most convenient. The iron tap in front is a separate matter; it may be water cooled, as by the usual dam. Two great advantages are gained—cinder and iron are tapped *directly* from the hearth, and all the loss of time and all the labor in cleaning the hearth are saved. Quite a number of other advantages are gained: The tuyeres can be put absolutely equi-distant, as no weak place has to be protected; and, in consequence, the smelting becomes perfectly even and the smelting column sinks vertically. As the heat is properly distributed, the quality of the iron made in the different parts of the smelting one is uniform. The blast is always on, and as no slow combustion takes place in the furnace while an open hearth is open, no *coal* is wasted. The air-heating furnaces are always kept in the same temperature, because the blast is always on; no coal is wasted, and clay and tools—now quite an expense—are done away with. So we have a self-acting apparatus, which is actually in the hands of the manager.

The drawings show LURMANN'S construction in detail, when applied to new furnaces. When applied to old furnaces the minor details may differ, but the main points remain the same, and as the whole idea is correct, its application to any furnace, *running on any material*, is unquestionable. If the furnace, *as such*, works—this arrangement does, and if the furnace does not work—no fore-hearth can help it. Moreover, a large opening may be made in the furnace, if desired, without touching a brick, simply by slipping out the *cinder-tuyere*.

The facts have shown that LURMANN was right, and in Germany the open front has become obsolete. In England, LURMANN'S system has been only within a few years fully adopted and indorsed by many of the leading men—by WM. WHITWELL, for instance—and I am not able to understand the objection of Mr. I. LOWTHIAN BELL, that the cooling effect of the cinder-outlet might be injurious to the furnace. Where then are half-a-dozen and more water-cooled tuyeres, this little casting ought not to take all the blame.



In this country the opinions are much divided. A great many of these furnaces have run with perfect success for years, in all parts of the country, and I am happy to say, that the different furnaces you will see in Cleveland, on your excursions, are of this improved stamp.

As to the opposition, which seems to be strange, it is susceptible of explanation: First, I myself have made mistakes, by taking the matter too easy, and by making too many compromises with the old constructions I had to deal with; furnaces were altered, while in blast, and, by doing this, part of the old fore-hearth was left, which filled-up and paralyzed the whole thing. In MR. PECHIN'S case, spoken of last night, I was imprudent enough to raise the tuyeres about a foot, while cutting off the throat of the furnace, which was in blast.

Another reason why all furnaces do not bear the stamp of Mr. LURMANN'S name as yet, is to be found in the fact, that most people would rather go step by step, than jump at things at once. A great many, seeing that a fore-hearth was not a necessity, have shortened it so much, that little is left, gaining by doing this some of the advantages the entirely closed front gives. Others close virtually and add some cleverly cooled casting somewhere near the cinder tap, which in some cases is done so nicely, that only a very expert man is able to detect the difference. This I do not say to complain—my object *here* can only be to speak about the technical points—and the above remark was only made to show that LURMANN'S sound plan has sent its roots much deeper than a superficial spectator might infer.

The increase of furnaces' product between the old system, as it was eight years ago, and the closed front *in full* has been found by careful comparison of a number of furnaces in Germany to be between 15 and 20 per cent.; the saving of fuel about 10 per cent.

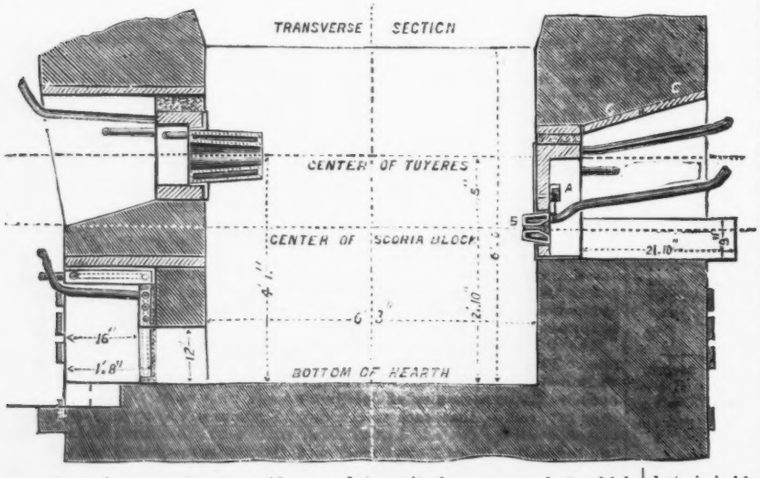
Our objection, the burning of the iron cinder blocks, has been done away with, by using hollow cast bronze blocks. These are almost indestructible; the cinder-outlet remaining always of the original width of 1¼ inch, the cinder runs off quietly and no hot air is blown out with it, though the blast is always on with full pressure.

MESSRS. TAWS & HARTMAN at Philadelphia have made, at my request, bronze cinder blocks and are now ready to cast tuyeres, either out of a proper bronze or of phosphor-bronze made by the Pittsburgh Phosphor-bronze Co. This latter composition, is the same as is used in England for tuyeres.

Toughness and rapid transmission of temperature are the two requisites wanted for a good tuyere.

The common bronze used in Germany is composed of 94 copper, 3 zinc and 3 tin; in other words, as rich in copper as it can be made for casting purposes, because copper is, next to silver, the best conductor of heat among the metals. If we place the conducting power of silver for heat at 1000, copper becomes 736 and iron 119.

Bronze tuyeres are actually cheaper than iron ones; they are more reliable, last longer, and can quickly be exchanged, because they keep bright, even when stuck well into the furnace.



* Paper read before the American Institute of Mining Engineers, at the Cleveland Meeting, October, 1875.

The Miners of Frostburgh, Md., held a meeting on the 31st ult., and those of Lonaconing, a few days later, to enter a protest against the proposed tax of two cents per ton on all coal mined in Maryland, and to petition the legislature to pass a law similar to that of Pennsylvania and other States to secure proper ventilation of the mines and the better protection of the health and lives of the miners.

On the Use of Pulverized Fuel.

Written for the ENGINEERING AND MINING JOURNAL.

By Chief Engineer B. F. ISHERWOOD, U. S. Navy.

EXPERIMENTS MADE AT SOUTH BOSTON, MASSACHUSETTS, TO DETERMINE THE ECONOMIC VALUE OF MESSRS. WHELPLEY & STORER'S PROCESS OF BURNING PULVERIZED COAL, MIXED WITH AIR AND FED BY A BLAST TO THE FURNACE ABOVE A BED OF INCANDESCENT LUMP COAL, COMPARATIVELY WITH BURNING LUMP COAL ALONE ON THE GRATES IN THE USUAL MANNER FOR THE GENERATION OF STEAM IN BOILERS.

CONCLUDED FROM PAGE 104.

GENERAL CONCLUSIONS.

FROM the preceding comparisons of the economic efficiency of the same coal burned in the lump and in the pulverized state, it is plain that the results of the experiments, so far from supporting the views of the patentees as to the greater economy to be derived from their process of burning coal in the pulverized state over the usual method of burning it in the lump state, proved that a loss and not a gain followed, but not in an equal degree for the two kinds of coal experimented on, namely anthracite and semi-bituminous. For the former the loss by the pulverizing process was 30.02 per centum, and for the latter 2.17 per centum. The anthracite seemed not only very badly adapted for economic burning in the pulverized state, but even in the lump state it gave an inferior economic effect to what is obtained from it in boilers of the same type and proportions as the one employed, and only 33 per centum of it could be consumed in the pulverized state. The semi-bituminous coal was much better adapted for combustion in the pulverized state—60 per centum of it could be thus consumed—and when burned in the lump state alone, the economic effect approached more nearly to what is given by it in other boilers of similar type and proportions. Doubtless, the more bituminous the coal the better is its adaptation for burning in the pulverized state, on account of its greater rapidity of ignition and combustion. Had any gain been found to accompany the burning of the coals in the pulverized state, that gain, whatever it might have been, would be entirely due to the pulverized portion alone, and would, therefore, have been greater with the coals allowing the greater proportion of them to be consumed in that state; in other words, the more bituminous the coal the greater would have been the gain when burned by the patentee's process. The great impediment in obtaining the maximum economic effect both from the anthracite and from the semi-bituminous coal in the lump state alone where the air is supplied by blowers is, probably, due to the difficulty of properly proportioning the quantity of air thus delivered to the quantity of coal consumed. With natural draught, and with perforations in the furnace door for the admission of air above the incandescent fuel, a higher vaporization could have been obtained from both coals when burned entirely in lumps, and, relatively, higher for the anthracite than for the semi-bituminous, because of the slower ignition and combustion of the former.

The experiments were made under the most favorable circumstances for the pulverized coal. They were made on the premises, under the eyes, and at the cost of the patentees. The best conditions were selected for giving the highest effect to the pulverized coal, and when the lump coal was used, it was burned under the same conditions, though they were not the best for it.

The maximum rate of combustion adopted in the experiments was as great as could be employed without too much sacrifice of the calorific effect. Of course, a very much higher rate could be commanded by the fan-blowers, but the pulverized coal required a certain time for ignition and combustion, and that fact limited the rate of combustion of the whole. These rates were no greater than would have been given by the natural draught of the boiler; but when pulverized coal was used, the artificial draught, by means of the fan-blowers was a necessity; and when lump coal alone was experimented with, it, too, was burned with the artificial draught, in order that the results might be rigorously comparable, and that the difference in effect, if there proved to be any, might be due wholly to the fact of using the coal in the pulverized state.

The previous comparisons do not include for the pulverized coal, the weight of steam required to produce the power expended in its pulverization and in working the fan-blowers, because it was desired to ascertain the economic result due purely to the combustion of the pulverized coal irrespective of the cost of pulverizing and delivering it into the furnace. The heating effect alone, separate from the cost of producing it, was the object in view; but in making a commercial comparison, there must be included for the pulverized fuel, not only the weight of steam required to produce the power for working the pulverizing mill and the blowers, but also the interest on their cost, a sinking fund, and the cost of their repairs.

WEIGHT OF COAL REQUIRED PER HOUR FOR WORKING THE PULVERIZING-MILL AND BLOWING-FANS.

It is evident that the commercial value of the pulverized coal, comparably with that of the lump coal, will be diminished by exactly the quantity required to evaporate the steam for operating the steam-engine working the pulverizing-mill and fan-blowers; inasmuch as neither the mill nor the blowers are needed when lump coal is consumed alone. As the steam for working this engine was taken from the boiler during the experiments, no measurement of it could be obtained; but if the assumption be made that the net horse-power is obtainable, as a mean in practice, for four pounds of coal per hour, then a close approximation can be had of the per centum reduction to be made from the vaporization result of the pulverized coal due to the consumption of steam for operating the engine, in order to obtain a commercially accurate comparable result with the vaporization result of the lump coal.

By net horse-power is here meant the indicated horse-power developed by the engine less the power required for working the unloaded pulverizing-mill and fan-blowers. It was found by repeated trials that the mean pressure per square inch of piston needed to work at the experimental speeds, the mill, when free of coal, and the fan-blowers when all admission of air was prevented, was 3.04 pounds by indicator. The net horse-power represents, then, the power required to do the work of pulverizing the coal and blowing the air inclusive of the friction of that work, but exclusive of the frictions of the engine, of the mill, and of the blowing-fans, and exclusive of overcoming the back pressure against the piston.

It was calculated (line 26 of the table) for the experimental speed of piston (line 18), and the net pressure on the piston (line 24), which net pressure is 3.04 pounds per square inch less than the mean gross effective pressure on the piston (line 23).

And 1st, as regards the anthracite. In experiments A and B, in which lump anthracite was burned alone by means of air supplied by the blower, the mean consumption was $\frac{158.125+200.094}{2}=179.110$ pounds per hour (line 13), and the net horse-power required to supply the air for combustion was $\frac{1.011+1.255}{2}=1.133$ which at four pounds of coal per hour gives 4.532 pounds, or the production of the artificial blast cost $\frac{4.532\times100}{179.110}=2.53$ per centum of the anthracite it consumed.

Now in experiments D and E, in which about 33 per centum of the anthracite was burned in the pulverized and 67 per centum in the lump state, the mean consumption was $\frac{161.792+215.896}{2}=188.844$ pounds per hour, and the net horses-power required for the pulverization and for the air supply for combustion was $\frac{4.706+5.478}{2}=5.092$ which at four pounds of coal per hour gives 20.368 pounds, or the pulverization of 33 per centum of the anthracite and the production of the artificial blast for the total weight of anthracite burned, cost $\frac{20.368\times100}{188.844}=10.79$ per centum of the total weight of anthracite consumed. Supposing, as previously determined, that 2.53 per centum of the anthracite consumed by the artificial blast is required to produce the blast, then there remains $10.79-2.53=8.26$ per centum of the whole weight of anthracite consumed, or $188.844\times0.0826=15.5985$ pounds per hour expended in pulverizing $\frac{2495+3420}{96}=61.615$ pounds (line 6) of anthracite per hour. In other words, so great is the resistance of anthracite to pulverization, that about one-fourth of its power-producing effect is expended to pulverize it.

Again, 2nd, as regards the semi-bituminous coal. In experiments F and G, in which lump semi-bituminous coal was burned alone by means of air supplied by the blower, the mean consumption was $\frac{159.240\times197.958}{2}=178.599$ pounds per hour, and the net horse-power required to supply the air for combustion was $\frac{0.943\times1.005}{2}=0.974$, which at four pounds of coal per hour gives 3.896 pounds, or the production of the artificial blast cost $\frac{3.896\times100}{178.599}=2.18$ per centum of the semi-bituminous coal it consumed.

Now, in experiment J and the mean of experiments H and I, in which about 60 per centum of the semi-bituminous coal was burned in the pulverized state and 40 per centum in the lump state, the mean consumption was $\frac{162.667+215.625}{2}=189.146$ pounds per hour, and the net horse-power required for the pulverization and for the air supply for combustion, was $\frac{2.823+3.007}{2}=2.915$, which at four pounds of coal per hour gives 11.660 pounds, or the pulverization of 60 per centum of the semi-bituminous coal and the production of the artificial blast for the total weight of semi-bituminous coal burned, cost $\frac{11.660\times100}{189.146}=6.16$ per centum of the total weight of semi-bituminous coal consumed. Supposing, as previously determined, that 2.18 per centum of the semi-bituminous coal consumed by the artificial blast is required to produce the blast, then there remains $6.16-2.18=3.98$ per centum of the whole weight of semi-bituminous coal consumed, or $189.146\times0.0398=7.528$ pounds per hour expended in pulverizing 115.385 pounds of semi-bituminous coal per hour. In other words, the resistance of semi-bituminous coal to pulverization is such, that $\frac{7.528\times100}{115.385}=6.52$ per centum of its power-producing effect is expended to pulverize it, which makes the resistance of semi-bituminous coal to pulverization one-fourth of that of anthracite.

From the above determinations it appears that in the case of anthracite, the previously determined per centum inferiority of the effect of the pound of its combustible portion where burned in the pulverized state to its effect when burned in the lump state, must be increased by the proportion required to produce the pulverization and the artificial blast, namely, 10.79 per centum, thus making the pound of the combustible portion of the anthracite when burned in the pulverized state $30.02+10.79=40.81$ per centum less commercially efficient than when burned in the lump state.

In the case of semi-bituminous coal, the previously determined per centum inferiority of the effect of the pound of its combustible portion when burned in the pulverized state to its effect when burned in the lump state, must be increased by the proportion required to produce the pulverization and the artificial blast, namely, 6.16 per centum, thus making the pound of the combustible portion of the semi-bituminous coal when burned in the pulverized state $2.17+6.16=8.33$ per centum less economically efficient than when burned in the lump state.

As the grate-bars of the furnaces of ordinary steam-boilers pass about twice the quantity of air chemically required for the perfect combustion of the coal upon them, there is no lack of oxygen, about double the necessary quantity of that element being present. The combustion, therefore, is as complete as a large superfluity of oxygen can make it; and where air is admitted through perforations in the furnace-door above the incandescent fuel, the combustion of anthracite is perfect within about 1½ per centum, and of semi-bituminous coal within about 2½ per centum. These are the only margins on which improvement is possible, and from the composition of coal and the nature of the process of combustion, it is not practicable to diminish them by any system whatever.

The only hope of improvement lay in some process by which as perfect a combustion as is now had, could be obtained with a less air admission; as obviously all the superfluous air present passes off with the chimney temperature and causes a loss of heat measured by the weight of such air, its specific heat, and the number of degrees through which its temperature is raised. The attempt of the patentees was in this direction, but its failure was complete; nor

was there any reason for believing that an intimate mixture of pulverized coal and air blown into a furnace could be as perfectly consumed as the lump coal upon the grates, with any less air proportionally admitted, Had, however, their expectations in this respect been well grounded, the large per centum of the coal required to produce the pulverizing power and the artificial blast would have exceeded the gain due to the decreased admission of air, and left, as now, a commercial inferiority for the pulverized coal.

QUANTITY AND QUALITY OF THE COALS.

During the experiments there were consumed 42,946 pounds of anthracite, of which 12.87 per centum was refuse in the form f ash, clinker, and soot. Of semi-bituminous coal there were consumed 42,139 pounds, of which 9.27 per centum was refuse in ash, clinker, and soot. Both coals were of excellent quality.

CORRESPONDENCE.

English Iron Works.

NORTH STAFFORDSHIRE DISTRICT.

Special Correspondence of the ENGINEERING AND MINING JOURNAL.

BIRMINGHAM, England.

THE appearance of the "Black Country" of South Staffordshire, from an agricultural point of view, is not a very pleasant one. So persistent is the natural growth of vegetation in the lowland counties of Scotland and England it is hard to imagine the great amount of mining and industrial manufacture that is going on in many districts where all the land not absolutely necessary for these establishments is always kept up to the highest pitch of cultivation. In the Black Country, however, the mines are triumphant, and have converted what was once said to have been a beautiful district into a collection of smoking manufactories, surrounded by slate and cinder heaps. When DUDLEY, the famous bastard son of a noble earl, made his experiments, over two hundred years ago, near what is now the large town of Dudley, on the use of coal for smelting iron, he, like many other investigators, could have had but little idea of what his discoveries would lead to. For nearly a century after his experiments were tried no great progress was made in their practical application. In the time comprised between 1740 and 1800 the change from the use of wood to that of coal in the blast furnaces of England was very rapid, so that at the latter date the charcoal furnaces had almost entirely been given up.

The district of South Staffordshire at that time contained between thirty-five and forty blast furnaces, which have since increased to the number of nearly two hundred.

The little strip of land within which they are included is about five miles wide, by twenty-five miles long, and is almost entirely underlaid by coal seam s, whose total thickness varies from 55 to 70 feet. These seams, which range from 4 to 30 feet in thickness, are included within a thickness of the coal measures seldom over 500 feet in height. It is owing to this abundant supply of fuel that the district had been so enormously developed during the last fifty years. Although, M. GRUNER, the French metallurgist, some fifteen years ago, came to the conclusion that the district still possessed sufficient coal to last for another century, many of the iron workers have, within the last two or three years, began to find it necessary to get their fuel from other quarters. Quite recently, however, a deep trial shaft, at Sandwell Park, has developed the fact that a considerable portion of the district which has hitherto been considered as nearly exhausted, is underlaid by untouched beds of coal, which will supply for many years a large proportion of the fuel needed.

With respect to the supply of native iron ore, the prospect does not seem to be as encouraging. The extent of territory over which these ores are worked and are known to exist is much smaller than that occupied by the coal, its area being hardly ten miles by five.

Much, too, of the ore was not taken out of the deep mines which were then only worked for coal, and now the filling up with water and sinkings of seams will prevent their successful re-opening. Like the black bands of Scotland these ores were neglected in the early period of iron-smelting of Staffordshire, but as long ago as 1830 they had completely taken the place of those brought from other districts. The ores, like all found in the coal measures, consist essentially of carbonate of iron mixed with clay, bituminous matter, and other impurities in very varying proportions. Some of the seams of ore have such chemical composition that the iron made from them is of a superior quality, and it is greatly owing to this fact that Staffordshire has been for so many years famous for its cheap brands of good merchant iron. Now, the more fortunate iron workers possess enough of these deposits to make iron from them for a few years longer.

Other furnaces, however, are run entirely or in great part with ores from outside sources, some even being brought from Spain and Algeria. The bar manufactories of the Black Country are in one respect much like those in Pittsburgh, that is, in their large working productions, so that the masters say that, even if they have to buy the pig iron which they need, they can still compete with other localities, now more favored in local resources or means of transport. The district has, however, several times within the last year met with competition from a foreign source, which has given much uneasiness and alarm for the future.

Belgium, with her fortunate combination of extraordinarily cheap labor, raw materials, and the best of labor-saving machinery, has been able to bid lower in the market of the world by from one to fifteen dollars a ton on certain classes of iron and steel goods, most of which are largely manufactured in the Black Country. Men even begin to talk of reviving in part the protective system, a circumstance rather amusing in this country, which looks upon the United States as a great public criminal for holding the same views. Fortunately, however, for English iron manufacturers in general, Belgium has not the capacity for a very great production, and, consequently, can only affect a small portion of the trade.

The prospect of the probable exhaustion of the ore and coal beds of this district, in a few years, has had the very natural effect of preventing much progress in the way of the adoption of new inventions and of mills of modern forms of construction. The BESSEMER process, for this reason, and also from the fact that neither suitable ores are found native (nor are the facilities for obtaining foreign ores so good as in those districts nearer the sea), has only been introduced in one place. It is well-known how Mr. BESSEMER hoped to drive the puddling furnace out of this district, but those mischievous elements, phosphorus and sulphur, still protect the ancient regions.

The principal owner of the best mineral property of the district is Earl DUDLEY, and so considerable are his resources that he has, with very great wisdom, put up a large plant of the most modern construction for the manufactureof pig and merchant iron. This establishment is called the Round Oak Iron Works. The mill buildings are constructed entirely of stones, cast and wrought iron, and while being conveniently arranged, they show what is rarely seen in an iron works, some evidence of architectural taste.

In the puddling department a new form of furnace has been in operation some time, which seems to combine some very good features of construction with considerable economy in wear, and use of coal, over the ordinary furnaces. The bottom or sole of the puddling chamber is round, and is made by joining together two semi-circular cast iron plates which are supported on two I wrought iron girders. The sloping sides of the chamber are made of four cast iron plates which are bolted together and rest upon the sole. Each of these pieces are curved so as to give the puddling chamber a shape not unlike a round bake pan.

The brick work of the furnace instead of being inclosed in large cast iron plates, strengthened by cross bolts, is surrounded by a very ingenious lattice-work bracing, which is made up of old rail iron and puddle bar. The neck of the furnace is fitted with a dandy for heating the pig iron before charging. The bottom and sides of the puddling chamber are fitted in the ordinary manner, and to insure the safety of the cast iron plates a water basin is placed under the sole, and on which the I girders, before spoken of, rest. The heat from the inside radiates down and converts enough of this water into moisture to keep the plates sufficiently cool. The manager of the works thinks that with this change in form he is able now to puddle a ton of iron with from 15 to 16 cwt. of coal where it took 30 cwt. formerly. If, however, a saving of 8 or 10 cwt. is effected the improvement is an important one.

A few of these furnaces have been fitted up with blowers to burn the fine slack coal, but as yet the experiment has not been fully tried. All of these furnaces are provided with GRIFFITH'S patent puddler. As this machine relieves the workmen from all labor except the mere guidance of the rabble, one puddler with two helpers is able to manage a double furnace and turn out 4½ tons of puddle bars in 12 hours. The iron is all boiled, sometimes with additions of a small amount of wrought scrap. To insure as perfect separation of the cinder from the puddle balls as possible, they are all worked under the old-fashioned helve-hammers. As the force of blow given by these hammers is constant, the manager is always certain that the iron has been properly worked, when it is brought down to size. One of the trains used for making merchant iron and small rails is worked by a fine double-cylindered engine, the gearing between the fly-wheel and the rolls being very perfect.

The manager has been experimenting for some time on a Belgian patent gas furnace, which in its construction is quite different from that of Siemens. The gas generators, instead of being built at a distance from the furnaces, are directly adjacent to the walls of the heating-chambers, so that little or no heat is lost by the conversion of the coal into carbonic oxide.

The complication of regenerators is not introduced, the superfluous heat being used for generating steam in a horizontal boiler over the furnace.

This arrangement admits of the great advantage of using gas instead of raw coal for doing the heating, while, at the same time, the cost of the furnace is but slightly greater than that of the ordinary forms. The blast furnaces connected with these works are very solidly built, but lack in some of the particulars of the best appointed furnaces of the latest date. They are built in cupola form and are forty-eight feet high.

The hearth bottoms and sides, as high up as the tuyeres, are made of cut sandstone blocks. They are all open-top furnaces, flues however being made in the sides, to take off the waste gases for heating boilers and hot blast stoves. The blast is heated to 700° and is blown into each furnace through six tuyeres. There is here what is very rarely seen in England, a well-built casting-house for each furnace.

The battery of long egg-ended boilers, with their apparatus for consuming the furnace gases, which are used to generate steam for the blowing engines, are a very magnificent piece of construction.

Our San Francisco Letter.

Special Correspondence of the ENGINEERING AND MINING JOURNAL.

SAN FRANCISCO, January 24, 1876.

WHEN, thirteen years ago, as a passenger on a Panama steamer, I passed through the Golden Gate and entered the spacious Bay of San Francisco, I did not, at first sight, regard the straggling city on the shifting sands as a very attractive place. I remember that part of my first day on shore was spent in climbing the steep grades in the northern part of the city, and curiosity led me from one street to another to see how often I could reach a "jumping off" terminus, where the rippling tide was lapping the base of a rugged cliff. Though at that time Market street had a car track which stretched far away into the sand hills towards the Mission, it gave no great promise of becoming, within a single decade, the important thoroughfare it is to-day. If some genie possessing prophetic power had appeared in those days to a new comer, wading through the heavy sand, half a mile from Montgomery street, and advised him, as a sure way of obtaining wealth, to purchase at current rates, all the city lots he could secure, I doubt if there would have been one out of ten persons so advised willing to take the wise counsel. Those same verdureless lands, and others which in early days had been covered over with cheap buildings, are now worth from $200 to $2,000 a front foot, according to the desirableness of the locality. The Russ House block on Montgomery street, occupying one of the best business positions in the city, was bought, in 1849, by the late Mr. RUSS, along with some adjoining, land for two ounces of gold dust, worth about $34. Under even a forced sale this property would now bring $3,000,000, and it has not yet reached its maximum value by any means.

GREAT CHANGES IN BUSINESS CENTERS

have been effected in the short space of a dozen years, and these seem, to a large extent, to have been brought about according to the dicta of the mining stock brokers. The suckling "bulls and bears" of 1863 were mostly found at the northerly end of the level portion of Montgomery street, but in these later bonanza times the full grown shaggy combatants of the stock operating arena have their haunts a quarter of a mile farther south. The erection of the Palace Hotel at the south end of Montgomery street was intended to play a part in shifting the business center, and, in connection with improvements on Market street beyond that point, the effort is certain to prove a complete success.

WHAT THE PRECIOUS METALS ARE DOING.

A person familiar with cities on the Atlantic Coast will, in walking along our

principal streets, be astonished at the dimensions and elegance of the business blocks and hotels he observes on every hand, particularly if he makes allowance for the short period within which this growth has taken place. By asking a few questions he will find that a valuable business property on one street is owned by the well-known mining operator, whom I shall call Mr. NUGGET, and that another splendid structure, still more attractive, belongs to Messrs. VENTURE and PATIENCE, who, in place of receiving supplies of gold and silver once every three years, like King SOLOMON, have wagon loads of precious bricks delivered at their doors every few days, without either apes or peacocks being present. The owner of a lofty brick edifice, or of some choice corner lots, will be referred to as a certain magnate who cut the steps by which he climbed to office with a silver pick discovered in the bowels of a grand old sage-scented mountain in the State of Nevada; or the stranger will perhaps be told that the massive pile of brick and iron before him, comprising theater, hotel, stores and offices, all in one block, is the plaything of Mr. SILVERY FORTUNATUS, who made the whole by speculating in Comstock mines, and yet, strange to say, did not know what a great thing he was doing until the result had been attained.

It is a sure thing that there cannot be a valuable mineral discovery made anywhere on the Pacific slope without San Francisco deriving advantage from it. Nearly every man who makes a fortune by the sale of mines in Nevada, Utah, or Arizona comes to this city and invests in real estate, or goes into business in some portion of the State, and draws his supplies from here. The main hindrance to our growth is to be found in the inveterate habit, common to all classes, of dealing recklessly in mining stocks on margins, that is, beyond their actual available means.

While the city owes its progress, to a large extent, to the mining interests of the coast, as already indicated, its small householders are in numberless instances reduced to absolute poverty by stock-gambling. A man only three months from the Atlantic States, thinks he can make money speculating in stocks, and in a few weeks his wife and children are very likely to be homeless.

BULLION FOR THE CENTENNIAL.

There is some talk of the Virginia Consolidated and California Mining Companies making a great effort during the coming month of May to extract the largest possible amount of bullion the mines can be made to yield, and to exhibit it during June in the Centennial Building. It is estimated that by employing extra quartz mills, and reducing only the higher grade ores, $10,000,000, or even a great deal more may, be produced during a thirty days' high-pressure run. To enable the companies to make the exhibition, it will be necessary that the Government should purchase the bullion, and incur the loss of at least a month's interest. It is no doubt, in one respect, a most commendable thing to display to the world the immense mineral resources of the "Great West," and the fabulous wealth of the Bonanza mines, but I suspect that underneath the contemplated pile of silver bars a rampant feline will ultimately be found concealed, seeking an opportunity to suck the financial blood of all the men and women it can reach. The Bonanza mines require no such boastful display to prove that they are of wondrous value, and the mere outside adventurer ought not to have excitements leading to rash speculations prepared for his special benefit. [If the Government is willing to purchase bullion to exhibit in the way indicated, it may, and perhaps ought to—logically—go a little farther.] There is the great California farmer, JEROBOAM WHIPSTOCK, whose wheat crop extends over 20,000 acres, which he could reap, thrash, turn into flour, and even bread, that with proper assistance could be eaten, all within the space of a month. If the Government will buy Mr. WHIPSTOCK'S flour and exhibit in pyramidal form the loaves of bread made from it, the public will enjoy the greatest sight of the age as a thirty-day product. By all means let us have both the bullion and the bread displayed as "big things," and if HANG WO, the old Chinese gardener in a Californian valley, will send overland a full month's crop of vegetables, to be paid for by the Government, there will be such huge beets, and cabbages, and murphies, and squashes placed on exhibition, as have never been seen on earth since simple old Adam lost his first situation by a blunder in fruit. Then shall the State of California appear before the assembled world, at Philadelphia, as if she were "some pumpkins" indeed. E.

The Mineral Wealth of Southern Colorado.

Special Correspondence of the ENGINEERING AND MINING JOURNAL.

COLORADO, January 25, 1876.

SAN JUAN County, that of late has caused so much attention, is situated in Southern Colorado, and will, perhaps, best be bounded by latitude 37° 30′ to 38° 30′ and longitude 106° to 108° west of Greenwich. It includes close to 5,000 square miles mineral land, and only the extreme roughness of the country and the difficulty of ingress and egress can account for the fact that those mighty deposits of coal, iron, gold, silver, copper, and lead have lain unworked to the present day. But thanks to the hardy pioneer and the zeal of the Government, the topography of the country is now better known and the access comparatively easy into these mountains of untold wealth. For the geologist and mineralogist, the field is as interesting as it is large; but whatever benefit may arise from this fact to the sciences, the commercial value can hardly be over-estimated, and should an estimation be made of the probable value of the gold and silver mining alone, during the next five years, an almost fabulous result would be obtained, even though a proper allowance were made for the difficulty of bringing cautious capital to aid in the developments.

Hardly two years have elapsed since the treaty with the Indians, and the developments in mining and the treatment of the ore at home, are only of the crudest kind. The territory prospected will scarcely exceed 100 square miles, yet the records of the different counties—La Plata, Hinsdale, Rio Grande, Conejos, Saguache and the new county of San Juan—are credited with, in round numbers, 10,000 locations, and allowing 95 per cent. of these to be comparatively worthless claims, there is still a very respectable figure as representing claims worked with profit. Taking the average from the different assay offices, this estimate will fall far below the actual facts; but although it is safe to say that every lode has been assayed, still there is always a tendency with the miner for high assays, necessarily giving an estimate of this kind a wide fluctuation. The years of 1874 and 1875 give from that source an average, in round numbers, of $300 per ton of 2,000 lb., the number of assays being nearly 4,000 each year, one-eighth of which were above $150 per ton at the office of the Uncompahgre. The following is the result, and as the branch at Del Norte is connected with it, a larger district is represented, and it can thus be properly taken as an average of the other seven or eight offices that are working in the country

No. Assays.	District.	Highest.	Lowest.	Average.
221	Uncompahgre	$8 342	0.18	$569.38
76	Lake	13,695	0.65	765.14
67	Eureka	2,101	24.00	461.91
47	Decatur	69	noth	32.16
42	Sangre del Christo	371	"	47.26
38	Summit	5,603	"	297.12
9	Bitter Creek	10	"	8.09
18	Adams	397	16 00	193.78
21	Animas	5,983	0.13	867.13
19	Del Norte	22	noth	11.02
7	Unknown places	6	"	3.94

The whole number being 565, and the average $296.02, one-fifth of the assays being $100 per ton and upward, and were the samples from which the assays were taken honest representations of their respective mines, it certainly reflects well on so new a mining country. S.

Strains in Trusses.

TO THE EDITOR—SIR: In Mr. TRAUTWINE'S article under the above heading in the ENGINEERING AND MINING JOURNAL of January 8, he asks for enlightenment on some problems in framing. I think the following explanation will clear up his doubts. He says, "Neither the principle of the parallelogram of forces nor that of the lever is applicable to the finding of strains in trusses, *except where said strains are transmitted along members capable of reacting against them with hinged or pinned joints.*"

If in Fig. 1 we suppose the junction of the different beams of the framing *absolutely rigid* the problem is changed from the consideration of a framing, to that of a beam resting on a pier at each end, and the beam may be considered as a lever. In this case, considering only the weight of (*b*), and neglecting the weight of framing, the problem is solved by the formulæ,

$$\Sigma X = o \quad \text{I}$$

$$\Sigma Y = R + Q - b = o \quad \text{II}$$

$$\Sigma(Xy - Yx) = Qxad - bxav = o \quad \text{III}$$

where R=pressure on pier (a), Q pressure on pier(d).

Again he says, "the joints would yield if pinned." Of course they would, unless equally weighted, as there is but one rectilinear figure whose shape is unchangeable as long as the length of the sides is unchanged, viz., the triangle, and the framing referred to is quadrilateral.

In the case of equally distributed loading, which he again supposes in Fig. 1, he says: "The joints will be firm if pinned. It is true the system thus arranged would stand, but would be in *unstable equilibrium.*

In Fig. 2 it is evident that the joints would resist the strains if pinned, because the framing is triangular. And the same is evident on the supposition of a tie introduced from (c) to (a) Fig. 1. Again in Fig. 3 the joints would yield if pinned because as in Fig. 1 the triangulating of the framing has not been attended to, or if *supposed* rigid, then it is no framing, but a lever communicating a purely vertical pressure to the piers.

"Can any one of your readers tell us the actual amounts of the strains on the truss Fig. 4 with the strut (bd) omitted, also the process for finding them?"

The answer is that the framing in Fig. 4 *could not stand* if the beams move freely on the pins, hence any calculation by statics would be fallacious. And if the joints be so strengthened by iron straps or mortising, as to be rigid, then the system is converted into a beam, and must be calculated by the lever formulæ previously given. D. COGHLAN.

SAN FRANCISCO, Jan. 19, 1876.

A List of Colored Pencils Adapted to the Wants of Engineers and Geologists.

TO THE EDITOR: SIR—I have found it very convenient to employ colored pencils in preliminary mapping and profiling rocks, and have had some trouble in selecting a considerable number differing from each other sufficiently, not to be confounded by one having an ordinary perception of color.

The following list of 31, selected from two of the best makers, I find to answer my purpose. The general name of the kind of rock (mostly metamorphic) represented by each color, as employed by me, is also given. Varieties are represented by letters or a conventional sign in ink. Each worker will, of course, make a scheme to suit his special wants in his field and office-work. In publishing it, it is certainly desirable to follow some uniform method in the employment of colors to represent rocks—if there is any uniformity.

In the case of metamorphic rocks, I doubt if American geologists could do better than to follow the Canadians, who have done the most and best work in the Archæan, and have sent forth excellent maps. I do not know whether they have published a conventional code of color, like the Geological Survey of Great Britain; if so, I should be much disposed to follow it. I dare say some of your readers know about this, and may take interest enough to give information on the subject. Very respectfully yours, T. B. BROOKS.

DRESDEN, Saxony, Dec. 20, 1875.

No.	A. W. FABER'S Colored Pencils.		No.	G. W. SUSSNER'S Colored Pencils.	
	German name of color.	Rocks represented.		German name of color.	Rocks represented.
2	Chromgelb.	Argillaceous.	2	Hellgelb.	Argillaceous.
16	Fleischfarb.	Talcose.	3	Hellblau.	Micaceous.
28	Umbra.	Silurian.	4	Orangegelb.	Gneissic and Granitic.
29	Dunke'grün.	Greenstone.	5	Japan Braun.	Limonitic or Brown Hematite.
38	Zinnoberroth.	Red and black iron oxide.	8	Carminrosa.	Marble.
39	Meergrün.	Anthophyllitic.	9	Cpt. Mort. Braun.	Silurian.
41	Schwarz.	Carbonaceous.	10	Miloriblau.	Hornblendic.
43	Florentinbraun.	Limonitic or brown Hematite	11	Chromgrün.	Chloritic.
50	Mineralblau.	Hornblendic.	12	Zinnober.	Red and Black iron oxide.
51	Blauviolet.	Magnetic.	13	Blaugrün.	Greenstone.
61	Olivbraun.	Melaphyr.	25	Terra-Sienna.	Garnetiferous.
62	Orange gelb.	Gneissic and Granitic.	33	Dunkelgelb.	Porphyry and Felsitic.
63	Resedegrün.	Chloritic.	36	Dunkelgrau.	Quartzose.
72	Krapprosa.	Copper Sandstone.	6	Saftgrün.	
75	Carminrosa.	Marble.	37	Hellgrau.	
88	Himmelblau.	Micaceous.			

Mineral Statistics of California for 1875.

THE following statistical items which we take from the elaborate annual review of the *Commercial Herald*, will be of present and future interest to many of our readers :

Borax.—The entire product of merchantable borax produced on this coast, being wholly from the States of California and Nevada, amounted, last year, to about 5,000,000 lb. Of this quantity 1,300,000 lb. was the product of the Slate Range District, San Bernardino County, California ; the balance coming nearly all from the Teel and the Fish Lake Marshes, in the State of Nevada. Of the State Range production, 1,200,000 lb. were manufactured by the Riddle Company, while of the quantity made in Nevada 2,140,000 lb. came from Teel's and 1,079,000 lb. from the Fish Lake Marsh, some 500,000 lb. having been turned out at various other localities. WM. T. COLEMAN & Co., as agents of the principal Nevada companies, report shipments during the year 1875 as follows : To Liverpool and London, 2,659,375 lb. ; to Hamburg, 215,799 lb. ; to Bremen, 10,000 lb. ; to China and Japan, 7,900 lb. ; to Australia, 1,500 lb. ; to Mexico, 1,300 lb. ; to New York, 814,760 lb. ; to Philadelphia, 124,158 lb. ; besides 1,598,866 lb. sent East by rail, making a total of 5,433.658 lb. Adding to this 627,685 lb. shipped by other parties, mostly by the RIDDELL COMPANY, we have 6,051,343 lb. to represent the entire exports for the year. The RIDDELL COMPANY, which made 600 tons last year, will increase their product to 1,000 tons the present year, the Nevada companies promising some, but not as large a percentage of increase, both the extent and the richness of the deposits there as well as in California, appearing to have been considerably overrated by those who first examined and reported upon them. While these borate fields cover a broad area, the crude material is much less abundant and of lower grade than was at first supposed, admonishing the owners of these valuable salines to economy in disposing of their contents. The mistaken notions in regard to the available quantities of these borates that early prevailed, filling foreign dealers with apprehensions of an immediate over-production, caused the rapid decline in price that has been going on for the past three years, during which this commodity fell from 28 c. to 6¼ c. per lb. The correction of this erroneous idea has already caused a stiffening of prices, which, it is believed, in well-informed quarters, must soon experience a material advance. Under vigorous working, the surface deposits of our borate fields begin to show signs of early exhaustion, while those of South America, the only quarter in which we have reason to fear competition, cannot, by reason of their poverty in the borate of soda and their inaccessible position, be made available as sources of large supply at present prices. The RIDDELL COMPANY, having filled a considerable contract at 6¾c. per lb., decline to renew the same or take orders at 6¼c., thinking better terms may soon be obtained. This company is in a prosperous condition, and having lately enlarged their works, as well as introduced some improvements in the methods of manufacturing, anticipate an increased production at a somewhat lessened pro rata of cost. They have, furthermore, the benefit of skill and intelligence in the field, and able financial management at headquarters. In disposing of their product the past year, this company has sold some to British buyers here and sent the balance to Eastern markets. At present they are separated from the railroad terminus by a space of 120 miles. As the track is advanced, this distance is being diminished and will next year be reduced to 80 miles. This Borax, as it enters the market, contains 95 per cent. boracic acid. Some small portions intended for special uses or certain branches of the trade being further purified and refined at the establishments here and in Oakland, an extra price is obtained for this commodity, though for most uses it is no better, and for some not so good, as the ordinary article of commerce. As the dealer here has to find his principal market abroad, he is forced to place himself in accord with the foreign agent, subordinating his views and line of policy to those of the latter. Just now certain European scientists are exercising themselves to discover some new uses to which this substance can be economically applied, and it is not unlikely that their endeavors will be rewarded with success. Until it shall appear, however, that there is likely to occur a much greater production than now seems probable, these efforts can hereby be considered well directed. At the close, we quote Concentrated, in sacks, by the car-load, 6¾@7c.—the regular agency price for Concentrated, by the carload, is 7⅛@8¼c.; Refined, 9¼@9¾c.

Exports by sea for—

To	1874 Cs.	1874 Pkgs.	1874 Value.	1875 Cs.	1875 Pkgs.	1875 Value.
New York	3,517	2,012	$101,546	262	5,489	$ 61,450
England	8,632	2,031	146,126	3,571	17,114	212,665
China	225	45	3,892	62	....	559
Japan	160	72	3,231	17	....	168
Mexico	27	....	898	17	....	220
Germany	1,944	1,034	40,229	1,406	348	16,436
Belgium	60	....	720	....	....	.....
Australia	42	....	504	15	....	283
British Columbia	6	....	76	2	1	39
Peru	10	5	235	....	....	.....
Society Islands	1	....	15	....	....	.....
Totals	14,624	5,199	$297,472	4,992	22,952	$294,770

Cement, Plaster, and Lime.—

Imports.	1871.	1872.	1873.	1874.	1875.
Barrels	32,602	54,740	61,911	79,435	96,984

The receipts of both Rosendale and Portland Cement, during 1875, show a large increase over those of the previous year. Prices in consequence have ruled low and unremunerative all the year ; stocks large. The manufacture of plaster upon this coast now is a perfect success, the Golden Gate Mill making a first-class article, fit for every purpose, out of gypsum, and is selling at $3@$3.25 per bbl., and can be supplied in any quantity. The ship *Oriflamme* has arrived from London with 2,250 bbl. Portland Cement. This article is largely used for making Frear (patent) Stone, and is preferred to all other for fine work. It may be quoted ex ship at $4@$4.50 per bbl., while HOFFMAN'S Rosendale is held at $3@$3.25, and Lawrenceville do. at $2.50@$2.75. Lime is produced here in endless quantity from Santa Cruz Marble, and is of very superior quality, commanding $2@$2.25 per bbl. The *Doune Castle*, from London, has 2,000 bbl. Portland Cement.

Our monthly receipts of California Lime compare as follows :

MONTHS.	1874. bbl.	1875. bbl.	MONTHS.	1874. bbl.	1875. bbl.
January	5,440	8,797	July	14,098	21,245
February	5,500	9,529	August	11,624	24,061
March	6,250	11,532	September	16,102	18,966
April	8,128	15,153	October	17,005	13,440
May	12,682	21,341	November	12,613	7,906
June	19,182	22,541	December	14,899	8,120
Totals				143,513	182,631
Increase in 1875				39,118	

Coal.—

ANNUAL RECEIPTS OF COAL AT SAN FRANCISCO.

Yrs	Mount Diablo tons.	Coos Bay. tons.	Bel'l'gham Bay. tons.	Vancouver Island tons.	Chili. tons.	Australia. tons.	English. tons.	Cumberland. tons.	Anthracite tons.	Seattle. tons.	R'ky M't'ain. tons	Ot'r co'n tries tons	Total tons.
1860	.....	3,145	5,490	6,655	1,900	7,850	6,640	5,970	39,985	.....	...	...	77,635
1861	6,620	4,630	10,055	6,475	12,495	23,370	21,565	2,975	26,660	.....	..	..	116,245
1862	23,400	2,815	10,050	8,87	5,11[illegible]	12,590	16,055	4,97[illegible]	36,685	.....	.....	...	120,545
1863	43,200	1,185	7,750	5,745	1,790	16,890	14,660	5,670	38,660	.....	.....	...	135,550
1864	50,70[illegible]	1,200	11,845	12,785	2,323	21,160	18,330	7,275	41,[illegible]80	.....	.....		167 298
1865	60,530	1,500	14,446	18,181	1,410	17,610	9,655	4,230	22,585	.....	.....	....	150,147
1866	8[illegible],020	2,120	11,380	10,852	1,480	53,700	7,402	9,524	12,124	.....	.....	.....	192,601
1867	109,490	5,415	8,899	14,829	14 949	26,619	7,302	12,177	48,518	.....	...	727	248,925
1868	132,537	10,524	13,866	23.348	8,511	31,590	29,561	2 292	29,597	.....	.....	204	282,025
1869	148,722	14,824	20,552	14,880	1,114	75,115	17,386	11,536	24,841	.....	.....	....	328,973
1870	129,761	20,567	14,355	12,640	7,35[illegible]	83,982	31,196	9,322	21,320	....	.....	....	320,493
1871	133,485	28,690	20,284	15,621	4,161	38,942	54,191	6,060	7,231	4,918	1,025	583	315,194
1872	177,232	32,562	4,100	26,08	3,682	115.332	29,190	10,051	10,618	14,830	1,862	...	434,467
1873	171,741	38,066	21,211	31,435	400	96,435	52,616	8,8[illegible]7	18,295	13,572	1,904	50	454,582
1874	206,255	44.857	13,68[illegible]	51 017	.....	139,109	37,826	15,475	14 263	9,027	433	.	531,947
1875	142,808	32,869	10,445	61,072	.....	136,[illegible]69	57,849	10,328	18,810	67,106	53	....	538,209

In making this exhibit, it should be stated that the Central Pacific Railroad handled much of their own coal, bringing it from the Lincoln Mine, California, and Rocky Mountain, from Wyoming Territory. They also use more or less Mt. Diablo ; and of all this consumed by the railroad, we take no account in our statistics. The Pacific Mail Company have a contract with the Wellington (V. I.) Coal Mine for a large monthly supply, and only what is landed here enters into our statistics. The same company are now seeking to make a like contract with the Seattle Mine, Washington Territory. The Coos Bay Company have been much interrupted the past six months in getting their coal to market, by reason of loss of one of their best steam colliers, adverse winds, stormy weather, and bad luck generally. The great falling off in the Mt. Diablo product is remarkable, and at this writing we have no cause to assign for it. The Seattle Mines, Washington Territory, show a large increase in their product, as do also the Wellington and Nanaimo Mines of Vancouver Island. These three last-named bituminous enter very largely into local use for household purposes. There have been times during the year when Lehigh run short of supply by reason of the non-arrival of ships, causing very high prices to rule, and necessitating the bringing of a few car-loads across the continent by rail ; but all that is now remedied and overcome by reason of fresh arrivals by sea—the *Centennial* having some 500 tons, and the ship *Golden Fleece* 1,750 tons Lehigh. These, with other lesser invoices recently at hand, have caused prices to drop from $25 to $15 per ton ; in fact, we doubt whether these cargo parcels could be placed better than $12. So, also, in regard to Cumberland, by reason of the non-arrival of the ship *Itasca*, 253 days out from Baltimore, supplies threatened to give out ; but dealers in the trade purchased from outsiders 1,000 tons or more, and now that the ship has safely arrived in port and no more to arrive in some four months, prices of Cumberland in casks have been fixed to dealers at $22, and in bulk at $18. The supply of Sydney has been very constant all the year, and during the last quarter thereof, cargo sales of steam were made as low as $8 50@8 75. At this writing, Wallsend may be quoted at $9 25@9 50, ex-ship. The importation of Australian steam coals during the year has not been profitable, and the same remarks are, no doubt, applicable to both Scotch and English steam. We quote : Bellingham Bay at $8 50 ; Coos Bay, $10 ; California Mt. Diablo steam, $6 25@8 25 for fine and coarse respectively ; English and Scotch steam, $9@10 ; Nanaimo, $9 50@10 ; Seattle, $9 50@10 ; Anthracite, $12@15 ; Lehigh, $15@16. Imports during the week embrace the following : *Prince Rupert*, 600 tons Wellington ; *Gem of the Ocean*, 1,011 tons Seattle ; *Hannibal*, from Newcastle, N. S. W., 1,662 tons ; *Marmion*, 1,200 tons from Seattle.

Quicksilver Production and Trade of California.—The exports to the different countries for 1875, and the three previous years, were as follows :

To	1872.	1873.	1874.	1875.
New York	1,202	....	315	287
China	4.810	1,900	1,200	18,190
Mexico	5,038	3,761	4,104	5,757
South America	1,300	508	738	2,149
Australia	643	105	100	832
British Columbia	2	11	2	17
Other Countries	103	74	311	1,728
Total flasks	13,098	6 359	6,770	28,960

And our exports previously have been:

	Flasks.		Flasks.
In 1871	15,205	In 1861	35,995
In 1870	13,788	In 1860	9,448
In 1869	24,415	In 1859	3,399
In 1868	44,506	In 1858	24,142
In 1867	28,853	In 1857	27,262
In 1866	30,287	In 1856	23,740
In 1865	42,469	In 1855	27,165
In 1864	36,927	In 1854	20,963
In 1863	26,014	In 1853	12,737
In 1862	33,747	In 1852	900

Exports by sea for -

To	1874 Flasks.	1874 Value.	1875 Flasks.	1875 Value.
New York	315	$35,696	287	$ 17,253
Mexico	4,104	426,249	5,757	375,120
Chile	404	39.888	355	24,803
New Zealand	51	5,345	258	14,074
Bolivia	134	13,805	...	...
China	1,200	135,878	18,190	1,003,842
Japan	248	27,751	968	56,116
Central America	12	1,195	34	1,794
British Columbia	2	207	17	931
England	...	.....	100	7,650
South America	200	22,185	2,149	154,184
Australia	100	11,475	832	47,905
Calcutta	...	.....	10	550
Russian Asia	...		3	195
Totals	6,770	$719,674	28,960	$1,704,417

The total receipts at the tide water from all the cinnibar mines of the State

exceed 50,000 flasks, while the exports by sea are 35,000. The shipments East overland during the year have been larger than usual, while the consumption of the Bonanza and other mines has been considerably more than ever before, and promises to be even greater in the near future. Colorado gets her supply via New York cheaper than it can be procured from this coast, owing to lessened transportation charges. Our accumulated stock is very small, the export trade and home consumption thus far taking it off as fast as brought to the market. This shows most conclusively that a low price greatly favors increased consumption in China, Mexico, and in fact the world over. Overland exports of 1875, 10,434 flasks; 1874, 5,859 flasks. Increase in 1875, 4,575 flasks.

Our monthly receipts of this article compare with 1874 as follows:

	1874		1875	
MONTHS.	Bay. flasks.	Coast. flasks.	Bay. flasks.	Coast. flasks.
January	972	25	1,605	2
February	1,709	..	3,284	309
March	1,830	..	3,779	465
April	1,862	..	3,718	100
May	1,964	20	3,298	303
June	1,845	..	3,776	320
July	1,923	..	4,229	428
August	2,132	15	4,016	269
September	2,849	24	4,746	292
October	2,821	9	4,899	151
November	2,095	..	5,278	205
December	2,089	..	4,537	241
Totals	23,591	93	47,165	3,085
Increase in 1875	23,574	2,995		

Salt.—

Imports.	1874.	1875.	Exports.	1874.	1875.
Tons	2,811	3,092	Tons	220	147
Sacks	15,390	24,814	Bags	711	1,597
Cases	200	60			

The market is very slack. The local California supply from the Bay promises to be very liberal this season. PLUMMER'S Christal Works will turn out 2,000 tons—absolutely pure—selling at $12 50. We quote Liverpool Stoved factory filled, at $17@$18 50 per ton; Coarse, $12@15.

The Coal Trade of Nova Scotia.

THE production of coal for the year 1875, as compared with that of previous years, was as follows:

	Production in			
	1875.	1874.	1873.	1872.
Cumberland	60,944	49,599	26,345	14,153
Pictou	337,102	357,926	333,984	388,417
Cape Breton	304,702	337,016	520,189	380,274
Other Counties	4,047	4,586	588	3,070
Total tons	706,795	749,127	881,106	785,914

To this amount, however, must be added about 13 per cent. to represent the consumption at the collieries, the above amount representing the quantity of coal thrown on the market. This amount was disposed of as follows:

Markets.	1875—Tons.	1874—Tons.	1873—Tons.
Nova Scotia	212,630	214,965	215,296
Quebec	189,754	162,260	187,059
New Brunswick	85,968	78,841	68,217
Newfoundland	62,348	55,696	55,867
P. E. Island	43,641	41,948	26,840
United States	89,746	138,335	264,760
West Indies	16,429	47,844	54,213
South America	4,779	5,077	1,885
East Indies	1,003	.....	.....
Great Britain	497	4,152	6,976
Total	706,795	749,127	881,106

Notes.

Monument to Schneider.—M. SCHNEIDER'S workmen are subscribing for a monument to his memory at Creuzot. They decline to receive contributions from outsiders.

Reduction Works are being erected at Darien, Ct. Several car-loads of ore arrived lately from Omaha, at an expense of between $300 and $400 per car. This, it is said, will be reduced by a peculiar and cheap method.

The Springfield, Jackson and Pomeroy (Ohio) Narrow-gauge R. R. is pushed vigorously. It will open up 188,000 acres of tested coal territory, capable of yielding 100,000 bushels of excellent coal per acre.

Fire in a Salt Mine.—A fire has occurred in a salt mine in Galicia, more than 900 feet in depth. Two hundred men were saved. Attempts made to rescue a few who were left behind ended fatally, and in all it is believed that eight lives have been lost.

Exhibition of Scientific Instruments.—The Crown Prince and Princess of Germany received the leading German scientific men on Tuesday, to confer upon the means of securing an adequate representation of Germany in the exhibition of scientific instruments to be held in London next May. Besides Doctors ACHENBACH and FALCK, the Ministers of Commerce and Education, there were present Herren KIRCHHOFF, DUBOIS, REYMOND, DOVE and FOERSTER, as professors of physical science; Herren HOFFMAN and MAGHELLANS as chemists: and Herren REULEAUX and SIEMENS as representatives of mechanical science. Professor OWEN represented the London committee. A German committee was formed to promote the objects of the meeting. Our manufacturers of scientific instruments should take note.

Heracline.—According to *La Houille*, experiments have been made with this new explosive in pits belonging to the Montrambert Company near St. Etienne (Loire). They go to prove that heracline gives better results than powder with half the charge. Being slower in combustion, and its effects less sudden, the blocks of coal, etc., are better split and less disturbed, the effect-work in proportion to the explosion being greater. The flame being projected to a less distance than with gunpowder, work in fiery mines is rather less risky. The vapors produced by its combustion are innocuous. Its action in respect to hard coal is reported as being particularly satisfactory, the explosion, owing to its slowness, opening any fissure that may permeate the standing coal, and facilitating the work of the pick.

Proposed Pennsylvania Legislation on Mining Questions.—Several bills have been reported favorably in the Pennsylvania State Senate bearing on troubles in the coal regions. One provides for the appointment of a joint special committee to investigate the causes of disputes between employer and employed in the coal business of this State, and to suggest legislation, if they can, for the speedy adjustment of the disputes. Another bill prescribes how the employés of persons, partnerships, associations, and corporations engaged in the mining of coal or the manufacture or production of iron and steel shall be paid for their labor and services. Senate bill No. 54 is an act for promoting the qualifications of engineers of stationary engines and securing the safety of persons employed in and about the anthracite coal regions of Pennsylvania. None of these bills have yet received discussion.

Telegraph Stations in Mid-Ocean.—Several foreign naval powers are directing their attention to the practicability of establishing telegraph stations in mid-ocean, by which messages can be sent from any part of the sea along the line of the cable to the terminal points on shore, and *vice versa*, so that communication with ironclads, mail steamers and other vessels when out at sea, may be established. The invention consists of a hollow sectional column, with a base plate attached by ball and socket joint, which column is lowered into the water, and anchored rigidly to the ground. The branch cable is coupled to the main cable, and carried along the column to the surface of the water, to be there connected with instruments on board the vessels. By this invention it is proposed to control naval and strategical movements, whilst a ship in distress could communicate her exact position, the nature of disasters, and thus procure assistance.

The Turned Chilled Car-Wheels which Mr. HODGMAN, Master Mechanic of the Philadelphia, Wilmington & Baltimore Railroad, had turned off a few months ago and put in service under one of his engines are still running, we learn. It may be remembered that this pair of wheels was taken out of service on account of flat spots which had been worn in the tread. These spots were turned out, and the wheels again put in service. They have now run over 20,000 miles, and are, apparently, good for an indefinite number of miles more. The same company has had twenty-four wheels turned, which are now in service under passenger cars. Railroad men will doubtless wait for the result of this latter experiment with very great interest. The LONDELL Car Wheel Company is having a lathe built expressly for turning chilled wheels after they are put on the axles.—*Railroad Gazette.*

Compressed Air Locomotives.—An improved compressed air locomotive has been invented by Mr. LEON RIBOURT, of Altdorf, Switzerland. The locomotive is like one of ordinary construction, having, instead of a boiler, a large and strong reservoir, which is charged with compressed air, and having large cylinders, so as to work with moderate pressure under that of the partly exhausted reservoir. Between the main reservoir and the cylinders are placed the regulating apparatus and a small subsidiary reservoir in the course of the pipe from the regulator to the cylinders. The regulator consists of two pistons connected together to work in a cylinder, open at one end to the air, and at the other end communicating with the subsidiary reservoir, while the middle space, between the two pistons, communicates with the main reservoir, and also by side holes with the subsidiary reservoir, these holes being governed by a slide attached to the pistons. The pistons are pressed inwards by the atmosphere and by an adjustable spring, and outwards by the fluid at the working pressure in the subsidiary reservoir, and according as the latter pressure exceeds or falls short of the atmospheric pressure, aided by this spring, so the slide covers or uncovers more or less the holes in the cylinder; and thus, notwithstanding considerable variation of pressure in the main reservoir, the working pressure in the subsidiary reservoir is maintained constant, or nearly so, and within limits may be varied by altering by an adjusting screw the force of the spring.

SELECTED LIST OF PATENTS.

FOR THE WEEK ENDING JAN. 28, 1876.

RELATING TO MINING, METALLURGY, GAS MAKING, ENGINEERING, &C. REPORTED FOR THE "ENGINEERING AND MINING JOURNAL" BY LOUIS BAGGER & CO., SOLICITORS OF PATENTS, WASHINGTON, D.C.

172,093. Devices for Supplying Air to Furnaces, A. J. Creigh, Mansfield, Ohio.—This is a furnace provided with air-distributing pipes, the naked tapering tubes are provided with orifices for emitting the air-blast at different angles.

171,916. Sheet-Metal Scroll-Cutters, Wm. Clark, Salem, Ohio.—The stem of the movable cutter is carried in a cleft socket formed in the lower section of the vibrating head. The head consists of two sections, which are connected together by a hinge-joint, to the pivotal pin, of which one end of the pitman from the slotted crank-wheel, is attached. An eccentric shaft in the upper section is turned, and the head and movable cutter lifted, when the sheet upon which the design is traced is to be introduced between the cutters.

171,943. Car Brakes, Louis Grieser, Rushford, Minn.—Brakes operated by chain attached to segmental ratchet operated through lever-bearing pawl by eccentric on axle. Operation, or non-operation of devices governed by rotation of disk of irregular under surface bearing upon the ends of two sliding perpendicular rods.

171,946. Subjectors for Steam Boilers, Wm. T. Messinger, Somerville, Mass.—While the valve is closed, steam can only flow from the lower chamber of the valve case, into that part of the bore of the outer nozzle which is in rear of the partition, and thence into, and through the inner nozzle.

171,959. Processes for Imparting Resonance to Metallic Alloys, B. Silliman, New Haven, Conn.—The alloy is immersed for a short time in a bath which is heated to a temperature just short of the melting-point of the alloy.

171,963. Centrifugal Gas-Purifiers, P. Sweeney, New York, N. Y.—A hollow shaft passes vertically through the center of the cylinder chamber, and has secured to its lower end the hollow centrifugal wheel, from which the gas escapes, and above this are secured perforated diaphragms, placed at different angles. A secondary purifying-chamber has within it a revolving annular chamber, from which the gas escapes at the bottom, and it is supplied with sponge.

172,023. Steam Vacuum-Pumps, A. Huffer, Hayestown, Md.—The valve governing steam-passages to the cylinders is moved at intervals by means of a ball rolling on a pivoted beam, having tappets pivoted to its ends.

172,038. Submarine Tunnels, Jno. F. Jones, Marcellus Falls, N. Y.—A submarine tunnel constructed of sections, and provided with packing and expanding rings in recesses, to prevent leakage. The stuffing-box for the shaft is provided with an adjustable face plate secured to the shield. The excavator is cone-shaped, and provided with cutting devices on its surface, and operated by gearing. The shield is provided with man-holes and a compressed air-chamber with another man-hole for access to the excavator. The shield is also provided with an inlet with screen on top and valve below.

172,047. Manufacture of Illuminating Gas, G. Olney, Brooklyn, N. Y.—The process of producing a fixed gas directly from hydro-carbon, by heating the hydro-carbon through a water, steam, or air-jacket, and passing the resultant vapors into a heated retort, where they are converted into a fixed gas.

172,157. Hydraulic Mining, J. O. Farrell, San Francisco, Cal.—Places a tube in front of the pipe nozzle, which conducts the water in hydraulic mining, and feeds this tube by a hopper with stones, etc., to aid in breaking down the bank.

Consolidated Virginia Mining Company.

SUPERINTENDENT'S REPORT.

THE fact that the Consolidated Virginia is far the most profitable mine in the world—counting its dividends by the million each month—and producing its ore worth hundreds of dollars per ton, in amounts which equal the output of a first-class colliery, gives every official statement concerning it of great interest. We, therefore, condense the following items from the annual report of the Superintendent, Mr. JAMES G. FAIR

Production of ore during the year 1875	169,307 tons (2,000 lb.)
Ore reduced during the year	169,094 1806-2000 tons.
Yield in bullion	$16,731,653 43
Average yield per ton of 2,000 lb	$8
Ore in ore house and at mills	2,988 194-2000 tons.
Valued by assay at	$478,080

This ore has been taken from the 1,200, 1,300, 1,400 and 1,500-foot levels, including a small quantity which has been gathered in the explorations which have been made on the 1,550-foot level.

On the 1,200 and 1,100-foot levels the ore bodies have not been developed as far as they extend north. On the 1,400-foot level the ore has been explored south 450 feet from the shaft, and it extends north from the shaft to the northern boundary of the mine. On this (the 1,400-foot) level, we know the exact width of the ore body.

On the 1,500-foot level the ore has been traced south for a distance of 480 feet from the northern line, and has been thoroughly explored by cross-cuts from the east wall to the west wall. On this level all the ore is of a high grade, and the width of the body varies from 150 feet to 320 feet. The ground south of this is entirely unexplored.

On the 1550-foot level a lateral drift extends the whole length of the mine. Starting at the southern boundary it runs northerly on the east side of the ore until it reaches a point 400 feet distant from the northern line, where it cuts through the clay, and thus passes all the way through ore to the northern line. This level is only partially developed.

None of the cross-cuts have yet reached the eastern boundary of the ore. The ore on this level is of a better quality than that which has been found on any of the levels above. Its width, I have no doubt, will prove greater.

At a point 320 feet south of the northern line, a double winze has been sunk from this (1550-foot) level to the depth of 147 feet. This winze has passed all the way through ore of a very high grade, and terminates in ore of the same quality. The sinking of this winze has temporarily been discontinued on account of the increase of water and our limited means of hoisting. From this same level, north of the northern line, another double winze has been sunk to a depth of 128 feet, through excellent ore the entire distance, and terminates in rich ore. The developments made by these winzes prove the continuity, at the lower depths, of the same ore body which exists on the level above, with an appreciation in the quality of the ore.

From this same level (the 1550-foot), at the southern boundary, a double winze has also been sunk down to the 1700-foot level. From the bottom of this winze a drift has been run north 107 feet. This winze and this drift are both east of the ore vein, and consequently no information in regard to the ore in this locality, and at this depth, has been gained by this work.

Work on this drift was discontinued two months ago on account of water which flowed into it from the Gould & Curry Mine. This obstacle will soon be removed and work will be resumed in this drift.

All the levels of the mine are connected by various winzes, reaching from level to level, for ventilation, and the passage of men and materials. The 1,200, 1,300 and 1,550-foot levels are connected with the Gould & Curry shaft for ventilation, and the 1,200, 1,300, 1,400 and 1,500-foot levels are connected with the Ophir mine for the same purposes.

There is a large reserve of ore in all of the levels of the mine which have been opened. In extracting the ore, instead of trying to show an extraordinary yield by the working of the higher grade alone, it has been my constant purpose to so unite the higher and lower grades of ore as to make the average yield conform to an average standard value. And this I have done, believing such a course to be for the best interests of the company.

The complete destruction of our hoisting works and ore house by the disastrous fire, which occurred on the 26th of October last, stopped all work in the mine from that day up to the 13th day of December, on which date we again commenced to hoist ore, and since that time more than 600 tons of ore have been raised daily. This quantity of ore exceeds our milling capacity, but in fifteen days more this milling capacity per day will be increased 260 tons.

The entire hoisting works, with ore house, have been rebuilt on an enlarged scale, with many improved conveniences in the various departments. A two-story building, 100 feet by 50 feet, is in process of erection, to be used for the assay and bullion department, and it is now about one-half completed. When finished there will be room and facilities for melting and assaying $5,000,000 of bullion per month.

A large extent of ground around and in the vicinity of the hoisting works has been purchased to give ample space for the storage of wood, timber, and mine materials. By the acquisition of this ground the hoisting works now stand in a comparitively isolated situation, so that there will be but little danger from any fire except that which might originate on our own premises.

For securing against all fires, the works are surrounded by hydrants, with a good supply of fire hose, and there is an ample supply of water under a heavy pressure. I will also add that the city of Virginia is constructing a perfect system of water works. These works will surround us and give additional protection against fire. The Virginia and Truckee Railroad encircles us on three sides, so that our mine supplies are conveniently landed on the west or upper side, and ore is expeditiously shipped from the east or lower side of the works.

The shaft is situated 1,040 feet east of the Consolidated Virginia shaft. It is now sunk, with three compartments, to the depth of 940 feet. The cost of this joint shaft to this date has been $436,183.13.

A drift is now being run east from the 1,500-foot level of the Consolidated Virginia mine, which will connect with the C. & C. shaft. It will reach that shaft and be in readiness for the transportation of ore as soon as the shaft is sunk to that depth. Three hundred and thirty-six (336) feet remain to be sunk to reach this drift.

After this connection with the C. & C. shaft is made, I feel safe in saying that our hoisting capacity will be 2,000 tons a day, and as to the supply of ore, we have now in sight in this mine a sufficient quantity to last for many years.

Yours, respectfully, JAMES G. FAIR, Superintendent.

SECRETARY'S REPORT.

RECEIPTS.

Bullion	$16,953,771 39
Bullion samples	3,767 60
Assay	1,544 44
Insurance	14,696 25
Balance account	87,106 20
	$17,060,885 88

STATISTICS OF COAL PRODUCTION.

This is the only Report published that gives full and accurate returns of the production of our Anthracite mines.

Comparative Statement for the week ending Jan. 29.

Tons of 2,240 lb.	1876. Week.	1876. Year.*	1875. Week.	1875. Year.*
Wyoming Region.				
D. and H. Canal Co	58,361	176,908	54,338	191,507
D. L. and W. RR. Co	42,755	167,080	42,499	177,514
Penn. Coal Co	29,313	103,462	22,059	92,933
L. V. RR. Co	25,382	90,986	18,720	74,398
P. and N. Y. RR. Co	826	2,978	1,301	1,482
C. RR. of N. J	29,558	84,958	7,348	23,403
	186,195	626,372	146,265	563,317
Lehigh Region.				
L. V. RR. Co	39,714	139,831	57,905	228,235
C. RR. of N. J	36,903	111,586	17,212	52,997
D. H. and W. B. RR	844	1,774	....	7,471
	77,481	253,191	75,117	282,703
Schuylkill Region.				
P. and R. R. RR. Co	76,115	143,974	50,666	149,286
Shamokin & Lykens Val.	4,468	14,612	10,036	35,150
	80,583	158,586	60,702	184,436
Sullivan Region.				
Sul. and Erie RR. Co	1,333	4,282	902	2,481
Total	345,592	1,042,431	282,976	1,038,937
Increase	62,616	3,494	..	..
Decrease	..	..	..	..

* Year beginning January 1st.

The above table does not include the amount of coal consumed and sold at the mines, which is about seven per cent. of the whole production.

The receipts at Port Richmond for the week were 13,500 tons, shipments 5,000 tons, and balance on hand 144,500 tons.

The decrease of shipments of Cumberland Coal over the Cumberland Branch, and Cumberland and Pennsylvania Railroads amounts to 1,257 tons, as compared with the corresponding period in 1875.

Perth Amboy business:

	Tons.
Received for the week	8,638 09
Shipped for the week	2,477 00
On hand Jan. 29	92,924 05

Receipts of Coal at Boston, for week ending Jan. 28, and years from September 1st, 1874 and 1875.

From	Week. Tons.	Previously. 1876. Tons.	1875. Tons.
Alexandria and Georgetown	—	53,053	45,700
Philadelphia	500	331,402	241,072
Baltimore	1,200	63,447	62,064
Other places	220	137,559	98,107
Great Britain	—	1,229	1,733
Nova Scotia	199	12,616	14,105

The Exports of Coal from Baltimore for the week were 255 tons, and since Jan. 1st, 3,557 tons, as against 4,627 tons for the corresponding period of 1875.

Belvidere Delaware RR. report.

	Week.	Year 1876.	Year 1875.
Receipts of coal at Coal Port (Trenton)	2,528	2,528	..
" " " South Amboy	20,258	68,715	13,167
Shipments of Coal Port (Trenton)	—	..	..
" South Amboy	2,638	25,377	20,979

The Production of Bituminous Coal for the week ending Jan. 29, was as follows:

Tons of 2,000 lb., except where otherwise designated.	Week, Tons.	Year, Tons.
Cumberland Region, Md.		
Tons of 2,240 lb	17,829	77,764
Barclay Region, Pa.		
Barclay RR., tons of 2240 lb	7,091	50,966
Broad Top Region, Pa.		
Huntingdon and Broad Top RR	2,872	10,185
*East Broad Top	1,664	4,348
Clearfield Region, Pa.		
*Snow Shoe	898	2,878
*Tyrone and Clearfield	17,073	48,009
Allegheny Region, Pa.		
*Pennsylvania RR	4,187	11,607
Pittsburgh Region, Pa.		
*West Penn. RR	4,786	12,654
*Southwest Penn. RR	1,432	4,123
*Penn. & Westmoreland gas coal, Pa. RR.	14,751	39,270
*Pennsylvania RR	8,011	21,630
Kanawha Region, W. Va.		

* To Jan. 21.

The Production of Coke for the week ending Jan. 21.

Tons of 2000 lb.	Week. Tons.	Year. Tons.
Tyrone and Clearfield	..	..
Alleghany Region	..	..
West Penn. RR	1,156	3,420
Southwest Penn. RR	9,932	25,115
Penn. & Westmoreland Region, Penn. RR.	957	2,206
Pittsburgh, Penn. RR	4,433	12,102
Total	16,498	42,843

COAL TRADE REVIEW.

NEW YORK, Friday Evening, Feb. 4, 1876.

Anthracite.

The adjourned meeting of the Combination was held on the 3rd inst., but still no definite arrangements for governing the trade of this year were adopted, when the meeting adjourned to next week. The great number of meetings that have been held, without arriving at any definite rules for the government of the Combination, is in itself sufficient evidence that serious differences exist in the views of the members. It is generally supposed that a radical change must be made in a compact that allowed the two Lackawanna Companies to mine far beyond their proportion of the total amount of coal going to market, while nominally they agree to divide the business in definite and pre-arranged propositions between them. This has been a serious question; and without some binding agreement can be adopted, there seems little use in pretending to control the trade. A Coal Combination, like an engineering structure, is only as strong as its weakest point, and if one of the parties can profit by an accident, to produce more than its proportion of the whole, another may find equal justification for underselling the market, and practically there would be no Combination.

We understand that there has been some difficulty in getting the Pennsylvania Railroad Co. to enter the combination, at least as regards its Shamokin and Neverton coal. Mr. SCOTT is said to have declined emphatically that he will not restrict the production of this region, while others of the combination believe the combination should include all or none. The Pennsylvania R.R. has so far increased its powers as a coal producer that it must enter the fold, or with it and the the Pennsylvania Coal Co. acting independently, the combination would be a mere name.

The recent unexpected drop in Combination prices to the Pennsylvania Coal Co.'s standard has created a very unfavorable feeling among dealers, who look upon it as a

breach of faith with them, this in itself may at present be of small importance, yet confidence in the rectitude of the Combination is as necessary as belief in its strength is in order to make it a success.

The cold "snap" of the last few days has somewhat increased the demand for house coals, but stocks are large and collections so hard that the general feeling of the trade is not bright. The stoppage of all the Anthracite mines from the 7th of February to the 11th of March will give a better tone to the market.

The Production of anthracite coal for the week ending Jan. 29th. was 345,592 tons, as against 276,623 tons for the week previous, and 282,976 tons for the corresponding week in 1875. The total production from January 1st, was 1,042,431 tons as against 1,038,937 tons during the like period of 1875. The above figures show an increase for last week, as compared with the previous week, of 68,969 tons, and 62,616 tons as compared with the corresponding week of 1875. The total increase since January 1st, as compared with 1875, was 3,494 tons.

Bituminous.

There is very little doing in either Cumberland or Clearfield coals, though there is a prospect of brisk business in both a little later on.

Gas Coals.—The event of the week in the coal trade has been the sale of about 200,000 tons of gas coals for delivery in New York at $5 per 2,240 lb. The coal will be supplied by the Westmoreland, Penn, Waverly (Youghiogeny), and some of the West Virginia Coal Companies. This sale fixes the price for the season at New York, and is equivalent to $4.50 f. o. b., at Baltimore, or $4.70 at Philadelphia. The price is 50 cents a ton less than that of 1874. As the price last year left but a small margin on coals at the mines, the present reduction comes mostly off of freights. No contracts have as yet been made for Provincial coals, and even should the proposed tariff bill be adopted and foreign coals admitted free of duty, there is little prospect of much being done in them. The duty amounts to 75c gold, per ton, and this reduction of 50 cents in our prices, has gone far towards neutralizing it. As it was made before the publication of the proposed tariff, it cannot be claimed as a consequence, by either free traders or protectionists. It is the general opinion in the trade that the abolition of the the duty on coal will have a scarcely perceptible effect on the coal trade, and indeed it is more likely to benefit our trade than otherwise by heading off the Canadian movement to but a duty on the importation of American coals into the Dominion. The outlook for the Provincial coal miners is not encouraging; except they can greatly reduce the cost of their production there is little prospect of competing successfully with American coals in any of our large markets. They should seek to make a home demand by the encouragement of iron works and manufactories.

Wholesale Prices of Anthracite Coal for Feb. f.o.b. at the Tide Water Shipping Ports per ton of 2240 lb.

	Lump.	Steamer.	Grate.	Egg.	Stove.	Chestnut.
Wyoming Coals.						
Lackawanna and Scranton at Hoboken and Weehawken	4 65	4 65	4 75	4 95	5 50	4 70
Pittston at Weehawken	4 59	4 50	4 60	4 80	5 35	4 55
Wilkesbarre at Port Johnston.	4 65	4 65	4 75	4 95	5 50	4 70
Plymouth, R. A., *Net*	....	....	4 75	4 95	5 50	4 70
Susque. Coal Co. at Amboy W.A.	4 65	4 65	4 75	4 95	5 50	4 70
Kingston at Hoboken	4 65	4 65	4 75	4 95	5 50	4 70
Lehigh Coals.						
Old Company at Port Johnston	5 25	....	4 90	5 00	5 50	4 85
Old Company's Room Run "	5 25	....	4 90	5 00	5 50	4 85
§Sugar Loaf, Hobok. &Amb."	5 25	....	4 90	5 00	5 50	4 85
Lehigh Coal Exchange "	5 25	....	4 90	5 00	5 50	4 85
Honey Brook Lehigh	5 25	....	4 90	5 00	5 50	4 85
Beaver Meadow at South Amboy	5 25	....	4 90	5 00	5 50	4 85
Schuylkill Coals at North 9th st., Brooklyn, E. D.						
Schuylkill white ash	4 65	4 65	4 75	4 95	5 50	4 70
Schuylkill red ash	...	....	....	5 05	5 55	4 70
Shamokin white and red ash..	....	....	....	....	5 70	4 75
Lorberry	....	....	....	....	....	....
Lykens Valley	....	....	6 40	6 40	6 40	...

	Per ton.
Freight from Hoboken and Weehawken to New York	40c.
" " Elizabethport & Port Johnston to N. York.	45c.
" " South Amboy to New York	50c.

Retail Prices in New York.

Anthracite.

Per 2000 lb.	Grate and Egg.	Stove.	Chestnut.
Pittston coal, in yard	$5 50	$5 80	$5 00
Lackawanna coal, delivered	6 75	7 00	6 25
Wilkes-Barre, "	7 00	7 25	6 50
Lehigh & Locust Mountain, del'd	7 25	7 50	6 75
Schuylkill Red Ash, del'd	7 50	8 00	

Our retail quotations of Pittston Coal are based on the actual selling rates of the company, nominal quotations of grate and stove are 20c., and of nut 30c. per ton above these rates. The Cost of delivery ranges from 40 cts. to $1 10 per ton, according to distance from the yard.

Bituminous.

Liverpool House Orrel, delivered, per ton of 2000 lb.	$23 00
Liverpool House Cannel " " "	25 00
American " " " "	15 00
Kanawha splint, " " "	15 00
American Orrel " " "	11@14
Red Bank Cannel " " "	14 00
Cumberland " " "	9 00

Baltimore, Md. Feb. 1, 1876.

Reported by our Special Correspondent.

No change.

ANTHRACITE.

Wholesale or Trade Prices per 2240 lb.

Wilkes-Barre "Lee" or "Diamond," Pittston and Plymouth. White ash.	In cars at depot.	By boats afloat.
Lump and steamboat	$4 80	$4 65
Broken	5 55	5 40
Egg	5 92	5 77
Stove	6 17	6 02
Nut	4 97	5 10
Shamokin, (red or white ash), and "Boston," freeburning white ash,		
Egg	5 95	5 79
Stove	6 15	5 99
Lykens Valley, red ash,		
All sizes	6 55	6 37

From wharf or yard, wholesale, 50@75c. additional.
By retail, all kinds and sizes, per 2240 lb. $7 00@8 00.

BITUMINOUS.

George's Creek and Cumberland f. o. b. at Locust Point	4 15	4 50
West Virginia f. o. b. at Locust Point		5 50
Youghiogheny Gas, f. o. b. at Locust Point		5 50
Swanton Coal, George's Creek		4 40

Boston. Feb. 1, 1876.

Reported by our Special Correspondent.

CARGO PRICES TO TRADE.

Lingan coal	$ 5 20	Westmoreland and Penn.	6 85
Caledonia	5 00	Waverly Co. Youghiogh'y.	6 80
Pictou	5 60	Cannelton Cannel	11 60
Block House	5 20	Cumberland	5 80@ 6 00
Red Bank Cannel	9 00	Anthracite .6 50@	7 25
Glace Bay	5 00	" retail..7 50@	8 00
Sydney	6 25		

Buffalo, N. Y. Feb. 1, 1876.

Reported by our Special Correspondent.

No change to note this week.

ANTHRACITE.

	Afloat. f.o.b.	Retail, Deliv'd.
Grate	$6 40	$7 40
Egg	6 40	7 40
Stove	6 85	7 85
Nut	6 60	7 60

	Lump.	Run of Mine.	Nut.	Slack.	Nut & Slack.
Connellsville Coke	$5 25	....	....	....	....
Brookfield Coal	....	....	....	....	....
Briar Hill	4 50	....	....	....	3 00
Youghiogheny	4 75	....	....	....	....
Monterey	3 75	3 50	3 25	2 50	....
Catfish	3 75	3 50	3 25	2 50	....
Stoneboro	....	....	3 25	2 50	....
Sterling Cannel	5 50	....	....	....	....
Buffalo Coal Co	3 50	3 25	....	2 30	....
Cameron	....	3 25	....	....	....

Chicago, Ill. Feb. 1, 1876.

Specially reported by Messrs. RENO & LITTLE, Coal Merchants. Retail prices per ton of 2000 lb. delivered to buyer.

No change in prices of coal.

		BITUMINOUS.	
Lehigh Lump	$10 50	Briar Hill and Erie	@ 7 00
Lehigh grate and egg	10 50	Walnut Hill, Pa	@ 6 50
Lehigh stove and chest.	11 00	Midway, Pa	@ 6 50
Lackawanna, Wilkes-Barre and Pittston*		Cannel	@ 8 00
		Blossburg	7 50
Grate and egg	9 50	Indiana Block	6 00
Stove and chestnut	10 00	Hocking "Brooks"	6 50
		Wilmington and Illinois	5 00

*,50 cents off these prices for car load lots to country dealers and manufacturers.

Cincinnati, O. Feb. 1, 1876.

Reported by our Special Correspondents.

Please quote following rates on coal here:

Per ton of 2000 lb.	Bush.	Ton.
Youghiogheny, or Pittsburgh, afloat	7½c.	—
Pomeroy coal	5 c.	—
Kanawha "	7½c.	—
Cannel coal, according to quality	16 c.	—
Semi-Cannel	7½c.	—
The following are the retail prices delivered		
Youghiogheny	—c.	$3 00
Semi-Cannel	—c.	3 50
Pomeroy	11c.	2 50
Cannel	—c.	5 50
Kanawha Semi-Cannel	—c.	3 00
Anthracite	10 oc@11 oc	
Coke, at yard	7c.	—
Coke, hard and soft, delivered	10c.	—

Cleveland, O. Feb. 1, 1876.

Specially reported by Messrs. WARNER, BATES & Co.

WHOLESALE.

Per ton of 2000 lb. f. o. b. vessels.

	For vessels,	On cars.
Youghiogheny Gas Coal	$4 40	$4 15
Cannel	4 50	4 15
Blossburgh	5 00	5 00
Briar Hill, Block Coal	3 80	3 60
Hocking Valley	3 25	3 10
Straitsville Coal Co., lower vein	3 25	3 10
Massillon	3 10	3 30
Tuscarawas Valley	2 85	2 70
Columbiana	2 80	2 60

RETAIL DELIVERED.

	Lump.	Nut.
Briar Hill	$5 00	$3 50
Massillon	4 50	4 00
Mineral Ridge	4 50	4 00
Columbiana	3 25	3 00
Straitsville Coal Co., lower vein	4 00	3 00
Tuscarawas Valley	3 25	3 00

ANTHRACITE DELIVERED.

	Grate.	Egg	Stove.	Chestnut.
Lehigh	$9 00	$9 00	$9 50	$9 25
Wilkes-Barre	8 10	8 10	8 50	8 25
Lackawanna	8 10	8 10	8 50	8 25

Detroit, Mich. Feb. 1, 1876.

Specially reported by Messrs. ROBINSON & KEYS, Dealers in all kinds of coal.

Per ton of 2000 lb.

Lehigh Lump, per ton	$10 50	Blossburg	8 50
Lehigh " prep.sizes.	10 00	Briar Hill	7 50
Wilkes-Barre, Grate and Egg	9 00	Willow Bank	7 00
Wilkes-Barre, Stove and Nut	9 50	Erie	50
		Massillon	7 00

Erie, Pa. Feb. 1, 1876.

Wholesale, per ton of 2000 lb. Bituminous f. o. b.

Briar Hill lump	$3 75	Beaver lump	$3 50
Midway	3 25	Cat Fish	3 00

Indianapolis, Ind. Feb. 1, 1876.

Specially reported by Messrs. COBB & BRANHAM.

We quote coal in our market as follows:
Wholesale on board cars, and retail delivered to consumers.
Per ton of 2000 lb., bushel of 70 lb.

BITUMINOUS.

IndianCreek, per ton	$2 75	Peytona cannel, per ton.	7 00
White River, "	2 75	Indiana Cannel	6 50
Brazil Block, "	2 90	Hocking Valley	4 25
Highland, grate, "	2 50	Youghiogheny	4 75
Block coal, nut, per car	18 00	Blossburg (smithing)	6 50
Highland " "	18 00	Piedmont "	6 50
Block Slack "	17 00	Gas coke, per bushel	10

ANTHRACITE (Lackawanna and Wilkes-Barre.)

Broken	$8 70	Nut	8 75
Egg	8 70	Stove	9 00

Lehigh Anthracite.

Broken	10 35	Nut	10 35
Egg	10 35	Stove	10 60

Retail, per bushel, delivered.

Sand Creek	16c.	Block Nut, steam	9
White River	14	" Slack, "	8
Brazil Block	15	Peytona Cannel	28
Highland grate	13	Virginia "	27
Block Nut, domestic use	12	Youghiogheny	22
Highland Nut, " "	12	Blossburg	26
" " steam	9	Piedmont	26

GAS COKE (measured.)

Crushed	15c.	Lump	12c.

ANTHRACITE.

Wilkes-Barre and Lackawanna (all sizes)	$9 75 per ton.
Lehigh, retail	$11 50 per ton.

Louisville, Ky. Feb. 1, 1876.

Specially reported by Messrs. BYRNE & SPEED.

WHOLESALE.

per bushel		per bushel
Pittsburgh	10c	Pine Hill	—
Raymond City	9c.	Kentucky	—

RETAIL.

per bushel		per bushel
Pittsburgh	14c.	Peytona Cannel	20@22c.
Raymond City	13c.	Buckeye "	—
Pine Hill	13c.	City-made Coke	11c.
Kentucky	12c.	Anth., per ton, $10 00 to 10 50	
Screened Pittsburgh per load			$3 00
Screened Raymond City			2 75
Pine Hill (Kentucky)			2 75
Cannel			$5 to 5 50

Milwaukee, Wis. Feb. 1, 1876.

Specially reported by Messrs. R. P. ELMORE & Co.

Retail price per ton of 2000 lb.

Lehigh Lump	$10 00	Briar Hill, select	$8 00
Lehigh Prepared	11 00	Blossburgh	8 00
Lackawanna (all sizes)	10 00	Cannel	8 00
Pittston	10 00	Pittsburgh	7 00
Scranton	10 00	Steam coal	5 00

New Orleans, La. Feb. 1, 1876.

Specially reported by Messrs. P. & R. DE VERGES, Wholesale and Retail Dealers in Pittsburgh, Anthracite, Cannel and other Coals.

Pittsburgh coal, retail, per bbl	55c.
" wholesale	28c.
" steamboats, per box	50c.
" to manufacturers, per bbl	45c.
" shipments, per hhd	$6 00
Anthracite, wholesale, per ton	....
" retail, "	....
Virginia Cannel, per bbl	80c.
Scotch " "	80c.
Mt. Carbon, wholesale, per bbl	...
" " retail, "	....
St. Bernard, wholesale, per bbl	50c.
" retail, "	....

Richmond, Va. Feb. 1, 1876.

Specially reported by S. H. HAWES, Dealer in Coal.

Per ton of 2240 lb., f.o.b.

Kanawha Cannel	$9 00	New River Bituminous,	$4 50
" semi-Cannel	4 75	Clover Hill Coal	4 00
Coalburgh Splint	4 75	James River Bitum	3 30
Lewiston "	4 75	" " Carbonite,	5 80
Kanawha Gas coal	4 50		

San Francisco, Cal.

From the *Commercial Herald*, Jan. 20, 1876.

The receipts for the week embrace a long-delayed, wind-bound fleet from Coos Bay, with some 2,500 tons of this favorite house coal. We also note the arrival from Bellingham Bay of the *Germania* with 1,375 tons; *Lookout* with 1,300 tons; *Orpheus*, from Newcastle, N. S. W., with 1,263 tons; *Mary Glover*, from Wellington, with 1,016 tons; *Menschikoff*, from Seattle, brought 300 tons. As stated in our last, the stock of Cumberland is well concentrated, while that of Lehigh is again open to competition. We quote Bellingham Bay at $8.50; Coos Bay, $10; California Mt. Diablo Steam, $6.25@8.25 for

fine and coarse, respectively; English and Scotch Steam, $9@10: Nanaimo, $9.50@10; Seattle, $9.50@10; Anthracite, $12@15; Lehigh, $14@15; Cumberland, $18@$22.

Toledo, Ohio. Feb. 1, 1876.

Specially reported by Messrs. GOSLINE & BARBOUR.

Per ton of 2000 lb. on cars.

Hocking Valley	$3 40	Massillon	4 00
Straitsville	3 40	Youghiogheny	5 00
Shawnee	3 40	Blossburg	7 00@7 50
" nut	2 90	Cumberland	7 00@7 50
Briar Hill	5 50	Connellsville coke	7 00

ANTHRACITE.

Grate, screened	$7 50	Stove, screened	$7 75
Egg, "	7 50	Chestnut "	7 50
Lehigh Lump	9 00		

40 cents to $1 per ton additional for delivery at retail.

Halifax, N. S. Feb. 1, 1876.

Prices per ton of 2240 lb. in gold.

Sydney (old mines)	$4 00	Little Glace Bay	3 35
Gowrie	2 35	Blockhouse	3 35
Victoria	——	Albion (at Railroad)	4 00

Toronto, Ont. Jan. 28, 1876.

Chestnut	$7 25
Stove	7 50
Egg and grate	7 25
Bituminous coal for domestic use	6 00
" " steam	3 50@5 50
Lehigh Lump and broken	7 50
Blossburgh	6 50

Montreal. Jan. 28, 1875.

Specially reported by Messrs. ROBERT C. ADAMS & Co.

Wholesale per ton of 2240 lb.

Scotch Steam	$6 00	Cape Breton Steam	$5 25
Pictou "	5 75	Newcastle Smiths,	7 50

Anthracite at retail, per 2000 lb., delivered.

Egg	$8 50	Chestnut	8 50
Stove	9 50		

Freights.

Per ton of 2240 lb.

Representing the latest actual charters up to Feb 3, 1876.

The following rates, with but few exceptions, are nominal; our quotations, in many instances, representing rates which were ruling two months ago.

PORTS.	From Philadelphia.	From Baltimore.	From Georgetown.	From Elizabethport, Port Johnson, South Amboy, Hoboken and Weehawken.
Augusta, Me	...	2 40	....	....
Albany	*85	1 70	...	....
Amesbury, Mass	....	....	....	....
Bangor, Me	†2 00	3 00	....	2 10
Bath, Me	1 60	2 00	3 00	1 30
Baltimore	....	....	....	....
Boston, Mass	§2 00	2 00	2 50	1 75
Bridgeport, Ct	*85	1 50	2 00	90
Bristol, R. I.	....	....	2 10	1 00
Cambridgeport, Mass.	§1 90	....	2 50	2 00
Derby	....	1 65	....	....
Dighton	....	1 70	....	....
East Cambridge	1 90§	....	2 60	§2 00
Fall River	1 50	1 50	....	1 00
Hackensack	....	....	....	....
Hallowell, Me	....	....	....	....
Hartford	....	1 65	....	....
Hoboken	†85	1 40	1 75	40
Hudson	....	1 65	....	....
Jersey City	....	1 40	1 75	40
Lynn, Mass	†2 10	....	....	†1 75
Middletown	....	....	....	1 25
Mystic	....	....	....	....
Newark	....	1 50	....	....
New Bedford	1 50	1 70	2 10	90
Newburyport	2 10	2 25	2 65	2 10
New Haven	*85	1 50	190@2	85
New London	1 50	1 65	190@2	1 00
Newport	1 50	1 65	2 10	1 00
New York	85††	‖1 30	1 80	40
Norfolk, Va	85	60	60	....
Norwalk	85‡	1 50	....	80
Norwich	1 50‡	1 90	....	1 00
Pawtucket	1 75‡	1 90	2 20	....
Philadelphia	....	1 00	....	....
Portland	1 95	2 00	2 50	1 60
Portsmouth, N. H.	2 05@2 10	2 15	2 75	2 10
Providence	1 50	1 50	2 10	1 00
Petersburg, Va	....	90	....	....
Portsmouth, Va	....	....	...	....
Poughkeepsie, N. Y.	....	1 50	....	....
Richmond, Va	1 00	70	....	....
Rockport	....	....	....	....
Saco	2 50	....	....	....
Sag Harbor	....	....	....	1 00
Salem, Mass	2 00	2 10	2 60	2 05
Salisbury Pt., Mass.	....	....	....	...
Savannah, Ga	....	1 50	....	....
Stamford	*85	....	....	90
Stonington	....	....	....	....
Taunton	.. .	..	....	....
Trenton, N. J	....	....	....	....
Troy	...	....	....	....
Warren, R. I.	....	....	....	1 00
Washington, D. C.	1 00	....	....	...
Wareham	....	1 75	....	....
Weymouth	2 00	2 00	2 60	....
Wilmington, Del	....	1 00	....	....
Wilmington, N. C.	....	1 50	....	....

* And discharging and towing. † And discharging. ‡ And towing. § 3c. per bridge extra. ‖ The rate to this point by barge is $1 70.

Rates of Transportation on Anthracite Coal to Tide Ports.

Lehigh and Wyoming Coals. per ton of 2240 lb	From Penn Haven.	From Mauch Chunk.	From Hazleton**	From Upper Lehigh.	From Ashley and Sugar Notch.
To ‡ Newark, N. J. (117 miles), via Central Railroad of New Jersey	2 60	2 46	2 93	2 93	3 16
‡ Mauch Chunk, Pa., via Central Railroad of N. J.	14	..	56	47	71
‡ Philipsburg, N. J., (46 miles)	99	85	1 32	1 32	1 65
Elizabethp't, (114 m.) Pt. Johns., Hoboken & South Amboy, N. J., shipping and wharfage 35c. add.	2 24	2 10	2 59	2 57	2 80
High Bridge, N. J.	2 40	1 95	2 80	2 54	2 72
Somerville and Raritan, N. J.	2 80	2 35	3 20	3 35	3 12
Elizabeth, Cranford, Westfield & Elizabethport, for consumption,	2 60	2 46	2 95	2 93	3 16
¶ Jersey City, N. J., (121 miles) and New York, via L. V. RR	2 85	2 40	3 17	3 24	3 54
Andover, via Delaware, Lackawanna and Western RR	3 30	3 10	3 70	3 69	3 99
Trenton Somerset Junction and Greensburg, via P. RR. Belvidere Division	2 65	2 45	3 05	3 04	3 34
Trenton, (97 m.) for shipment, including shipping and wharfage	2 11	1 95	2 45	2 46	2 76

From *Mauch Chunk* to *New York* (121 miles), (towing limits) and Jersey City† via Lehigh Valley RR. $2 37

From *Mauch Chunk* to *Philadelphia* (93 m.) via L. V. RR. and North Penn. RR 1 75

††From *Phillipsburg, N. J.* to *Hoboken* (84 m.) for shipment via Delaware. Lackawanna and Western RR., Morris and Essex Division 1 24

From *Lackawanna Junction* to **Auburn, N. Y.*, (191 m.) for shipment, via Southern Central R R. in connection with Pa. and N. Y. R.R. 2 53

From *Lackawanna Junction* to *Weedsport* (201 m.), for *Rochester and Charlotte* 2 59

From *Lackawanna Junction* to *Sterling* for *Oswego, N. Y.*. 2 62

‖ To this point for all places between Rochester and Buffalo the rate is 2 53

* The rate to this point for Syracuse is 2 02

** Rates on line coal from Hazleton are 10c. per ton above these figures.

‡ The cost of unloading is to be added to these rates. No charge less than 40c. per ton will be made for any distance. Tolls from Mauch Chunk to Phillipsburg for way points will be $1 15 per ton.

§ Twenty cents per ton less when five cars at a time to one party. Provided that where the reduction makes the rate $1 a ton, or less, the rate will be $1.

¶ 20 cents per ton additional for transferring coal from boat to boat, and 30 cents per ton for reshipment of same from wharves.

† Transportation on Coal destined for re-shipment from this point is 20c. less than above rate.

†† The rate for consumption to this point is $1 80.

The distances in the above table are computed from *Mauch Chunk*. From *Ashley* to *Mauch Chunk* the distance is 51 miles, and from *upper Lehigh*, 33 miles. From *Hazleton* 24 miles, and from *Penn Haven* 8 miles.

From *Wilkes-Barre* to *Perth Amboy* via the Lehigh Valley Railroad Company, the distance is 161 miles, and from *Mauch Chunk* it amounts to 106 miles.

Schuylkill Coals. per ton of 2240 lb.	From Pine Grove	From Tamaqua.	From Port Carbon.	From Mount Carbon.	From Schuylkill Haven.
To *Port Richmond*, for shipment, via P. & R. R. R., Main Line	2 12	2 07	2 00	1 99	1 92
Philadelphia, Retail yards	2 22	2 17	2 10	2 09	2 02
Harrisburg, via Lebanon Valley Branch	1 35	2 02	1 95	1 94	1 87
Allentown, via East Pennsylvania Branch	1 70	1 65	1 58	1 57	1 50
Lancaster, and Points on Lancaster Branch, via R. & C. R.R	1 82	1 77	1 70	1 69	1 62
Dauphin, via Schuylkill and Susquehanna Branch	85	....	1 43	1 42	1 35
Slatedale Junction via Berks and Lehigh Branch	1 88	1 83	1 76	1 75	1 68
Lebanon, via Lebanon and Tremont Branch	96	....	....	....	....

From *Tamanend* to *Catawissa*, via Catawissa and Williamsport Branch Railroad 94

From *Tamanend* to *Williamsport*, via Catawissa and Williamsport Branch Railroad 1 39

Coal sent to points on the Catawissa and Williamsport Branch will be charged one and one-half cent per ton per mile, and two cents per ton additional to Tamanend.

The rates of freight and tolls on lump and steamboat coal (except that sent to Richmond for shipment) will be twenty per cent., and on broken coal will be ten per cent. less than the above rates.

Alabama Coal Trade.

A correspondent writing us from Alabama, under date of January 25, says:—"There is no great change in the coal business since last year, except the enlarged output. We mined last year, in round numbers, fifty thousand tons of coal, and this year we will mine in the State about seventy-two thousand tons. Several new projects are on foot. One company has suspended operations. The demand is principally confined to local points inside the State. One shipment was made to the United States Government at Pensacola, and several gas companies are using our coal in preference to Pittsburgh. The only railroad using coal last year was the South and North RR. Co. The Alabama Central has just made contract for its use this year. The Eureka Iron Co. at Oxmoor propose to use coke and "Black Band" ore from the Warrior region.

IRON MARKET REVIEW.

New York.

FRIDAY EVENING, Feb. 4, 1876.

American Pig.—We are reported sales of 5,000 tons of Allentown iron to be delivered at Troy and Albany, and from 1,200 to 1,500 tons of Thomas. There is a little more inquiry, but it is not equal to that of a year ago, while those who inquire expect lower prices than are quoted. There does not appear to be a possibility of creating any excitement in the trade and advancing prices. Most buyers are only supplying their pressing necessities, believing that prices will not advance, and that there are strong prospects of a further decline. We quote No. 1 foundry at $23; No. 2 foundry, $21; and gray forge, 18@$20.

Scotch Pig.—There have been no arrivals of Scotch pig since our last. The business doing is confined to small lots only. Prices remain unchanged. We quote Coltness at $32 50@$33; Eglinton, $29.50@$30; and Glengarnock, $31.

Rails.—We are reported sales of 10,000 tons of Bessemer steel rails by Western mills, but with this exception we learn of no business, and but little inquiry. We quote iron, at mills, at $42@45, and steel at $62@65.

Old Rails.—We are reported no transactions, and in the absence of the same continue to quote at $21, although it is thought a considerable quantity could be bought for less.

Scrap.—There is nothing of importance doing in this article which we quote at $30@31.

Baltimore. Feb. 2, 1876.

Specially reported by Messrs. R. C. HOFFMAN & Co.

The iron market continues dull with small sales, but we look for more activity in the coming season, particularly for good brands of charcoal iron, which are in small stock here and South. We quote:

Baltimore Charcoal	$32@35	Anthracite No. 3	$21@22
Virginia Charcoal	28@34	Mottled and White	19@20
Anthracite No. 1	24@25	Charcoal C. B. Blooms,	70@75
" No. 2	22@23	Refined Blooms	60@65

Boston. Jan. 29, 1876.

PIG continues stupid and nominal, an inquiry being wholly exceptional. Quotations run their range from $19 to 28 for the various grades, buyers who are solicited being considerably confused by the variety of prices quoted. New York advices continue reporting No. 1, $22.50@23; No.2, $21@21.50; and gray forge, $15@19.

BAR has had a very small week, with no change reported in quotations nor any especial phase to the market. We give $51.50 as the current jobbing price for guaranteed refined. The combination on horse-shoe nails of the Vulcan and the Globe has had the effect of steadying the market, but the opening of the Boston Rolling Mill's line of shoes seems to have demoralized both the Rhode Island and Burden, while the latter are rumored as proposing to show a new shape and weight next month to meet this necessity. Meantime the B. R. M. brand is meeting with a free sale.

STEEL is selling in a small way, prices being guided very closely by the reputation on brands. The sales of agricultural steel are a trifle less than a week ago, with very little now doing in machinery.

We quote American tool, 14@15c.; American machinery, 9@9½c.; Bessemer tires, 6¾@7¼c.; SWEET'S excelsior tire, 8½@12c.; English tool, 17@18c., gold.

COPPER continues dull and easy, quoting at 23 to 23⅜c. for spots or futures.

For manufacturers we quote new sheathing 30c.; for bolts and braziers, 31c.; yellow metal bolts, 20@29c.

LEAD is quiet and steady.

We quote pig 6c. for domestic and 6⅜@6½c. for foreign; sheet and pipe lead, 9c., currency; tin-lined pipe, 16½c.; bar lead, 9c., less usual trade or 10 per cent. discount.

ANTIMONY is firm, with a small inquiry at 13½c.

SPELTER is strong and quiet at $7.45, 30 days, and $7.35, prompt cash, all currency. Silesian is dull at $7.75.

TIN is quiet, and stocks are held with considerable ease both in pig and plates.

We quote Straits 19@19½c.; Banca, 23½@24c.; Refined English 19@19½c., gold. We quote plates charcoal I. C., $7.50; coke, $6.75@7; and terne at $6.30@6.75, gold.—*Commercial Bulletin.*

Cincinnati. Feb. 1, 1876.

Specially reported by Messrs. TRABER & AUBERY, commission merchants for the sale of pig iron, blooms, ore, etc.

Below will be found closing quotations of our Pig Iron market.

CHARCOAL.

Hanging Rock, No. 1	Foundry	$25 00@	—4 mos
" No 2,	"	23 00@24 00	—4 mos
"	Mill	21 00@22 00	—4 mos
Tennessee No. 1,	Foundry	23 00@24 00	—4 mos
Tennessee, No. 2,	"	22 00@23 00	—4 mos
"	Mill	21 00@22 00	—4 mos
Missouri, No. 1,	Foundry	@	—4 mos

STONE COAL.

Ohio, No. 1, Foundry	22 00@23 00	—4 mos	
" No. 2, "	21 00@22 00	—4 mos	
Ohio Mill	20 00@21 00	—4 mos	
Missouri, No. 1 Foundry	27 00@	—4 mos	
" No. 2, "	26 00@	—4 mos	
" Mill	26 00(?)	—4 mos	

CAR-WHEELS.

Hanging Rock, C. B	40 00@50 00	—4 mos	
Tennessee "	30 00@33 00	—4 mos	
Missouri "	33 00@35 00	—4 mos	
Alabama "	30 00@33 00	—4 mos	

BLOOMS.

Charcoal	60 00@ 70 00	—cash

SCRAP IRON.

Cast	50c.@ 65	—cash
Wrought	90@1 10	—cash

Chicago. Feb. 1, 1876.

Specially reported by Messrs. ROGERS & Co., dealers in

The following are the present quotation for pig metal in our market :

Scotch and American pig iron.

No. 1 Coltness	$38 00@
No. 1 Gartsherrie	38 00@
No. 1 Summerlee	37 00@
No. 1 Glengarnock	36 00@
No. 1 Eglinton	35 00@
Warner's "American Scotch"	30 00@
Massilon No. 1 Foundry	29 00@
No. 1 Grand Tower Mo. ores (Bituminous)	29 00@
No. 2, " " "	28 00@
No. 1 Mill	25 00@
No. 1 Foundry, Ohio	28 00@
No. 2 "	27 00@
No. 1 Hanging Rock (charcoal)	28 00@
No. 2 " " "	26 00@
Union "A" 1 (Anthracite)	28 00@
Union "B" 1 (Anthracite)	26 00@
No. 1 Lake Superior (charcoal)	28 00@
No. 2 Lake Superior "	26 00@
No. 3 Lake Superior "	26 00@
No. 4 Lake Superior "	25 00@
Bessemer Steel Rails	65 00@
New Iron Rails	45 00@
Old Rails	28 00@

Cleveland, Ohio. Feb. 1, 1876.

Messrs. C. E. BINGHAM & Co., quote as follows :

Per gross ton, on four month's time. Subject to change in market. Discount for cash 4 per cent.

FOUNDRY IRON.

No. 1, Lake Superior Charcoal	28 50@
No. 2, "	28 00@
No. 1, Anthracite	26 00@
No 2, "	24 50@
No. 1, Bituminous foundry	26 00@
No. 2, "	24 50@
American Scotch, No. 1, Cherry Valley	29 50@
" " B—1, " "	27 50@
" " No. 2, " "	26 00@
No. 1, Massilon	28 00@
B—1, "	26 00@
No. 2, "	23 00@

CAR WHEEL AND MALLEABLE IRON.

No. 3 Lake Superior Charcoal	27 00@
No. 4 " " "	28 50@
Nos. 5 and 6 " "	29 00@

BESSEMER IRON.

Nos. 1 and 2 Lake Superior Charcoal	28 00@

FORGE IRON.

No. 1, Gray	23 00@
White and Mottled	22 00@

Indianapolis, Ind. Feb. 1, 1876.

Specially reported by NELSON KINGMAN, broker and dealer in pig iron, etc.

Prices remain the same.

Trade very dull at prices named below.

New Rails at mill	$48 00@50 00	
Old Rails "	24 00@26 00	
Hanging Rock Charcoal Pig No. 1 foundry	28 00@29 00	—4 mos
" " " " 2 "	26 00@28 00	—4 mos
" " " Mill	24 00@26 00	—4 mos
Car Wheel C. B	40 00, nominal.	

STONE COAL.

Indiana No. 1 Foundry pig Red Short	24 00@26 00	—4 mos
" 2 " " "	22 00@24 00	—4 mos
" 1 Forge " "	@	—4 mos
" 2 " " "	@	—4 mos
Ohio No. 1 Foundry pig Cold Short	25 00@26 00	—4 mos
" 2 "	24 00@25 00	—4 mos
" Mill	23 00@24 00	—4 mos
" No. 1 Foundry, Neutral	26 00@28 00	—4 mos
" No. 2 " "	25 00@27 00	—4 mos
Merchant Bar	2½c.	—3 mos
1st quality C. H. No. 1 Boiler Plates, per lb	5 c.	—3 mos
1st " Com. Sheet for No. 24, W.G. "	4 c.	—3 mos
1st " Charcoal Sheet " " "	5½c.	—3 mos
Best Bloom Galvanized Sheet, discount 20 per cent		—cash.
2d quality " " " 30 "		—cash.

f. o. b. in Indianapolis.

Louisville. Jan. 31, 1876.

Specially reported by Messrs. GEORGE H. HULL & Co.

The market is dull, but without change in prices.

The usual time, four mos., is allowed on the quotations below :

HOT BLAST—CHARCOAL.

No. 1 foundry, from Hanging Rock Ores	$25 00@26 00
No. 2 " " " "	23 00@24 00
No. 1, Mill, from " "	—@—
No. 1, foundry, from Alabama, Georgia and Tennessee ores	23 00@24 00
No. 2, foundry, from Ala., Geor'a and Tenn. ores	22 00@23 00
No. 1, Mill, from " " " "	21 00@22 00

HOT BLAST—STONE COAL AND COKE.

No. 1, foundry, from Hanging Rock ores	23 00@24 00
No. 2, " " " " "	22 00@23 00
No 1, Mill, " " " "	21 00@22 00
No. 1, foundry, from Ala. Ga. and Tenn. ores	23 00@24 00
No. 2, " " " " "	22 00@23 00
No. 1, Mill, " " " "	21 00@22 00
No. 1 foundry, from Missouri ores	24 00@25 00
No. 2 foundry, from Missouri ores	24 00@25 00
No. 1 Mill, from Missouri ores	—@—

COLD BLAST—CHARCOAL.

Car Wheel from Hanging Rock ores	35 00@40 00
" " Tennessee "	28 00@30 00
" " Alabama and Georgia ores	28 00@38 00
" " Kentucky ores	28 00@40 00

Milwaukee. Feb. 1, 1876.

The pig iron market remains much the same. Prices are as follows :

per ton of 2,240 lb.

Frankfort L. S. Charcoal, No. 1	$29 00
" " " No. 2 & 3	28 00
" " " No. 4 & 5	31 00
" " " No. 6	33 00
Mil. Anthracite L. S., No. 1	27 00
" " " No. 2	26 00
Wisconsin Iron, No. 1	25 00
Mahoning Valley Bit's No. 1	30 00
" " " No. 2	28 00

Pittsburgh, Pa. Feb. 1, 1876.

Specially reported by A. H. CHILDS, Esq.

The market is without material change. Holders continue firm at last week's prices although the demand has been somewhat less active. Quotations are :

No 1. foundry	$25 00@26 00—4 mos
" 2, "	23 50@24 00—4 mos
Gray forge	22 00@23 00—4 mos
White and mottled	20 00@21 00—4 mos
Warm blast charcoal	23 00@30 00—4 mos
Cold blast " Western	40 00@50 00—4 mos

Richmond, Va. Feb. 2, 1876.

Reported by ASA SNYDER, Esq.

Charcoal irons are firm at former quotations. Coke and anthracite irons are weaker. I revise figures to meet the market.

Virginia Cold Blast Charcoal Pig Iron	$27 to $33
" Warm " " " "	24 to 28
" " " Coke " " 1 X	23 to 24
" " " " " " 2 X	21 to 22
" " " " " " 3	20 to 21
" Anthracite 1 X	24 to 25
" " 2 X	22 to 23
" " 3	21 to 22

St. Louis. Feb. 1, 1876.

Specially reported by Messrs. SPOONER & COLLINS, Commission Agents for all kinds of Iron.

Our market remains the same as last reported. No change in price or demand. The latter is fair for small quantities. No good sales are reported.

We quote on four months' time :

Lake Co. Stone Coal No. 1 Fy.	$25@26	Massillon iron, A No. 1	31@32
" " " 2 "	24@25	" " B "	1.29@30
" " Gray Mill,	24@25	" " "	2.27@28
" Charcoal No. 1, Fdy.	24@25	Cold Bl. Car Wheel, Mo.	3.@40
" " " 2, "	23@24	" " " " Tenn.	33@35
" " Gray Mill,	23@24	" " " " Ala.	33@35
Tenn. " No. 1, Fdy.	24@25	" " " " H. R.	32@33
" " " 2, "	23@24	Mo. Charcoal Blooms	60@70
" " Gray Mill,	23@24	" Scrap "	55@60
Va. Coke, No. 1, Fdy.	25@26	" " hammered Billets	75@80
" " " 2, "	24@25	Assorted Bar Iron 2 35, 90days	
" "Gray Mill,	23½@24¼	No. 1 Wrought Scrap	10 ch.
H. R. Char. No. 1, Fdy.	26@27	Heavy cast "	95 "
" " " 2, "	24@25	Light "	60 "
" " Gray Mill,	24@25		

Montreal. Jan. 25, 1876.

We quote pig iron Eglinton and Clyde $21 to 21.50; Carnbroe $21 50 to 22; American $24 to 26.; Summerlie and Calder $22.00 to 23.00; Langloan and Gartsherrie $22.00 to 23.00; Coltness $22.50 to 23.50; Hematite $30.00 to 31.00. Bar, per 100 lb., Scotch and Staffordshire, $2.25 to 2.30; best do., $2.50 to 2.60. Swedes and Norway $5.00 to 5.50; Lowmoor and Bowling, $6.50 to 7.00.—*Monetary Times.*

METALS.

NEW YORK, FRIDAY EVENING, Feb. 4, 1876.

There is a fair jobbing business doing in most articles on this list. Prices show but little change. The proposed change in the import tariff has had no effect, in fact, many points in its relation to metals are not comprehended by the dealers.

Gold Coin.—During the week past gold has ranged from 112⅞@113¼, and closed at 112⅞.

Bullion.—Fine silver bar is quoted at $1 20@$1 21, gold, per ounce, and fine gold bar at par ($20 67, gold, per ounce,) to ¼ per cent. premium.

Copper.—The sales during the week have aggregated from 400,000 to 500,000 lb. at 22⅞@23c. The arrivals of copper overland from the Lake Region in addition to other lots arriving on the market has a demoralizing effect on prices, not so much from the quantity offered for sale, but from the uncertainty as to what quantity will be offered from these sources.

Tin.—There is some inquiry, but the business doing is confined to jobbing lots. We quote as follows, gold, per lb.: Straits in lots of 500 to 1,000 pigs, 18½c., and in lots less than 100 pigs, 18¾c.; L. and F., in five ton lots, 18c., and in lots of less than one ton, 18¼c; Banca, 22½c.@23c.; Refined English, 18½c. The latter quotation is quite nominal, as there is but very little, if any, of this brand in the market. It is reported that at the Dutch Trading Company's sale of Banca tin, last week, after offering a small quantity, the balance of the tin was withdrawn. The London quotations of Straits, to-day, are £80@81; Singapore quotes $22¾@23 per picul.

Tin Plates.—There is a fair business doing in these, and an improved inquiry. Prices are firm as follows : Prices gold, per box, Charcoal tins, $7.62½@$7.75 and ternes, $7.12½@$7.25; coke tins, $6 75, and ternes, $6.25@$6.37½.

Lead.—There is but very little business doing in this articie, simply the regular jobbing trade. Ordinary Domestic is quoted at about 6c., gold, and Foreign at 7¼c. At St. Louis, Missouri soft is quoted at 7c., currency, and hard at 675c., currency, with freight from there here 53c.

Spelter and Zinc.—The Combination has advanced the price of Domestic to 7¾c., currency. Foreign is quoted at 7¼c.@7½c., gold. There is no business worthy of note doing in either. Sheet Zinc is quiet at 8¼c @ 9c., gold.

Antimony, is quiet at 14¼c.@14½c., gold.

Quicksilver is unchanged, prices being as follows : in this city, per lb., 65c.; San Francisco, 60c.; and London, per bottle of 75 lb., £9 17/.

FINANCIAL.

New York Stocks.

FRIDAY, Feb. 4, 1876.

We note an advance (with but few exceptions) in the New York Stock List. The volume of business is less by some 2,000 shares than that reported in our last.

The stock of the Central Railroad Company of New Jersey has advanced 2 per cent. during the week, closing firm at 109, with transactions amounting to nearly 2,500 shares.

Delaware, Lackawanna and Western Railroad stock exhibits a fractional advance, with sales of 3,000 shares.

Mariposa Land and Mining Company has advanced 2 per cent. during the week, with sales of some 2,500 shares. The tunnel is 1,141 feet long; the fissure vein has increased to five feet in width and the quartz portion shows more gold than formerly. The annual meeting of this company will be held on the 15th inst.

St. Louis and Iron Mountain Railroad stock is firm at the quotations ruling in our last. Transactions for the week aggregate 1,100 shares.

At the annual meeting of the Maryland Coal Company, held in this city on the 1st inst., the following officers were re-elected for the ensuing year : President, HENRY LOVERIDGE; Secretary and Treasurer, SAMUEL T. ROSS; Directors, CHESTER W. CHAPIN, GEORGE L. KINGSLAND, LUDLOW PATTON, CHESTER W. CHAPIN, Jr., H. M. ALEXANDER, FRANCIS ROBINSON, RUBEN MANLEY, HENRY LOVERIDGE, GEORGE A. ELLIOT, J. COLEMAN DRAYTON; Mine Superintendent, O. D. ROBBINS. Shipping Agents : at Baltimore, E. PRATT & BRO.; at Georgetown, ALEXANDER RAY; at Cumberland, JOHN W. PEARCE.

The annual meeting of the Consolidation Coal Co., for the election of officers, will take place on Feb. 16th.

The annual meeting of the Delaware, Lackawanna & Western RR. Co. will be held on Feb. 22d.

Coupons and interest are due and payable, in New York, on the following bonds, during the month of February :

Coupons on the 1st mortgage bonds (due in 1890) of the Central RR. of N. J.

Cumberland Coal & Iron Co.'s coupons, paid by the Consolidation Coal Co.

Interest on the 1st mortgage 7 per cent. registered bonds of the Pennsylvania Coal Co.

Coupons on the 1st mortgage bonds of the St. Louis & Iron Mt. RR. Co.

Coupons on the bonds of the Joliet Iron & Steel Co.

The Columbia Oil Co., of Pittsburgh, Pa, announces a dividend of one per cent., payable on demand.

The Monongahela Navigation Co., of Pittsburgh, has declared a dividend of $2 per share, payable on demand.

The Grant Mining Co. and the Caratel Gold Mining Co. held their annual meetings on the 1st inst.

The Andover (Mass.) Iron Co., has its dividend period during the present month.

We note sales of 130 shares of the Santa Clara Mining Co., on the Baltimore Stock Market, at from 20 to 20½ per share; also sales of 600 shares of the stock of the Atlantic Coal Co. at 2.45 per share ex-dividend.

Sciota Valley R. R.—This Railroad is nearly completed to Chillicothe, Ohio, the track being laid some two miles south of Lockbourne, the road passes through the finest territory in the State, and taps the great coal and mineral region in the southern tiers of counties. It is expected that the road will compete largely with the

Hocking Valley road, and there is every reason to predict for it as brilliant a future as has been achieved by the latter road, which has proved, to the stockholders, the best in the State. When the proposed connection with the Chesapeake & Ohio road is consummated this will become a grand trunk route from the Atlantic to the great West.

Youghiogheny.—This road was built by the Penn Gas Coal Company about a year ago, to serve its own mines, is now known as the Youghiogheny, and is open to general traffic. It is run from Irwin's, in Westmoreland county, south by west to Sewickly, and is about nine miles long.

Bonds are firm with moderate dealings.

Quotations and Sales of Stocks and Bonds,

For the week ending Feb. 4, 1876.

STOCKS.

	Highest	Lowest	Closing	Shares sold.
Pennsylvania Coal Co	—	—	†280½	—
Consolidation Coal Co	—	—	49½	203
Spring Mt. Coal Co	—	—	62	—
American Coal Co	—	—	55	50
Maryland Coal Co.	—	—	18	—
Del., Lack., and West. RR. Co.	119	118¼	119	3010
New Jersey Central RR. Co.	109	107¼	109	2262
Delaware and Hudson Canal Co.	—	—	120	275
Quicksilver Mining Co. pref'd	—	—	24⅝	—
" " Common	—	—	17½	100
Mariposa Land & Min. Co. various.	11	8¾	9¼	2525
St. Louis & Iron Mountain RR.	20	19½	20	1100
Lehigh & Wilkes-Barre Coal Co.	—	—	40	—
Total Shares sold				9522
Sales for the week previous				11356
Decrease				1834

† Nominal.

BONDS.

	Sales.	Price
Ches. & O. R. R. 6s, 1st. coupon	7,000	30⅛@ 31
" " " ex coupon	500	— @ 27
Central RR. of N. J. 1st Mtg. N.	12,000	*114½@115
" " " 1st Cons.	17,000	103¼@111
" " " Convt.	13,000	108⅛@108¾
Del. and H. Canal, 1st Mtg. 84'	11,000	108½@109
" " 78, '77	—	— @102
" " Reg. '91	1,000	— @113
Del., Lack. & W. R. R., 78, conv.	—	— @118
" " " " 2d Mtg.	—	— @ —
St. Louis & Iron Mount'n 1st Mtg	2,000	— @100
St. Louis & Iron M'tn 2d Mtg.	—	— @ 62¼
Lehigh & Wilkes-Barre Cons.	23,000	97 @ 97¼
Total Sales	$86,500	

Closing quotations, in the absence of sales, represent the latest prices bid.

* Ex-interest.

Philadelphia Stocks.

PHILADELPHIA, Feb 4, 1876.

Transactions at the Philadelphia Stock Market show a falling off of some 34,000 shares compared with those reported in our last. Stocks are firm with the majority of quotations advanced a fraction.

The Pennsylvania Railroad Company announced its regular quarterly dividend at *two* per cent., or *one dollar* per share, payable on the last of the present month. This stock closed firm at 55¼, ex-dividend, with sales of 32,210 shares for the week. We note a sale of 300 shares of the Susquehanna Canal Company's stock on the Board at $8 50 to $9 per share.

From the *Annual Report of the Huntingdon and Broad Top Railroad and Coal Company* we take the following:

Year.	Receipts.	Expenses.	Net Earnings.
1875	$322,829 66	$157,349 54	$164,480 12
1874	284,720 68	184,210 34	100,519 64
Showing an increase in 1875 of			$64,960 78

"The expenses in 1875 were 49 per cent of the gross receipts; in 1874 they were 64 69-100 per cent of the gross receipts.

"The number of tons of freight removed in 1875 was 485,458 tons; of which 204,921 tons were Broad Top coal, and 175,154 tons Cumberland coal, the whole tonnage being 100,228 tons more than in 1874.

To show the exact change in tonnage, as compared with the previous year, the following table is submitted:

1874.		
Coal, Broad Top	225,292 tons.	
Cumberland	72,763 "	
		298,055 tons
Ore and limestone		51,812 "
Pig metal and other iron		7,673 "
Miscellaneous		27,685 "
Total		385,230 tons
1875.		
Coal, Broad Top	204,921 tons	
Cumberland	174,154 "	
		380,075 tons
Ore and limestone		63,658 "
Pig metal and other iron		14,155 "
Miscellaneous		27,570 "
Total		485,458 tons

Being 100,228 tons (29 per cent.) increase in 1875.

"The depressed state of the coal and iron trade felt so severely during the year 1874 has continued, and characterized the business of the past year. But one of the three furnaces on the line of your road has been in blast, and the same inactivity prevailing at many of the furnaces and rolling mills along the Juniata and Susquehanna, has materially lessened the demand for Broad Top coal, and consequently diminished its production and shipment. The peculiar fitness, however, of Broad Top coal for ocean steam purposes is becoming better known, and notwithstanding the great rivalry between the different coal regions to supply the demand in the seaboard markets for steamship fuel, Broad Top coal has not only maintained its place, but has gained in favor on account of its economic value, and for its known exemption from spontaneous combustion."

Sales of the stock of this company aggregating some 600 shares, have been made during the week, at from 15 to 16½ per share for the preferred, and 9¼ for the common stock.

The Oil Creek and Allegheny River Railroad Company, which was recently sold out on its consolidated or second mortgage of $1,100,000, and bought in by a committee representing the several interests in the company, met in Philadelphia recently for reorganization. The title resolved on for the new organization is "the Pittsburgh Titusville and Buffalo Railway Company," the capital of which is to be $5,000,000, and new stock to that amount is to be issued to the present holders of Oil Creek stock, being $50 550 more than the authorized capital of the old company.

The following securities were sold at auction, during the week—

85 shares Philadelphia & Reading RR. Co., at $53 per share.

48 shares of the Pennsylvania RR. Co., at $56 per share.

18 shares of the Lehigh Coal and Navigation Co.

63 shares Little Schuykill Navigation RR. & Coal Co., at $51.50 per share.

100 shares of the Delaware Division Canal Co., at $53 per share.

$4,000 of the 6 per cent. coupon bonds of the same Co., at 100 per cent.

$8,000 Philadelphia & Reading Coal & Iron Co. purchase money mortgage 7 per cent. bonds, at 89¼ per cent.

$2,000 Huntington & Broad Top Mountain RR. & Coal Co. coupons, 7 per cent. bonds, at 60 per cent.

68 shares of the Chesapeake & Delaware Canal Co., at $20 per share.

50 shares of the Pennsylvania Gas Coal Co, at $55 per share.

Coupons and Interest on the following bonds are due and payable in Philadelphia, during the present month.

Catawissa RR. 1st chattel and new mortgages.

Delaware & Raritan Canal Co. coupons.

Huntington and Broad Top RR. coupons on the 2nd mortgage gold bonds.

Interest on the Registered Loan (due in 1892 of the Lehigh Coal & Navigation Co.

Coupons of the Lykens Valley Coal Co., Morris Canal (scrip) interest paid on the same by the Lehigh Valley RR. Co.

The following companies hold their annual meetings on the 1st inst.: Delaware Division Canal Co., Huntingdon & Broad Top Mountain RR. Co., Buck Mountain Coal Co. (Feb 2d). The Fulton Coal Co. will hold their annual meeting on the 7th inst.

The Susquehanna Coal Co., the Pennsylvania Canal Co. and the Volcanic Oil & Coal Co. will hold their annual meeting on Monday Feb 8th, 1876.

Quotations and Sales of Stocks and Bonds,

For the week ending Feb. 4, 1876.

STOCKS.

	Highest	Lowest	Closing	Shr's
Lehigh Valley RR. Co	64	63¾	64	588
Pennsylvania RR.	56¼	55⅛	*55⅛	32210
Reading RR.	53⅜	52⅝	53	9331
Lehigh Coal and Nav. Co	51⅝	51⅛	51¼	5128
Penn. Canal	—	—	9	—
Buck Mountain Coal Co.	—	—	—	—
Fulton Coal Co.	—	—	3⅛	—
Locust Mountain Coal Co	—	—	—	—
Westmoreland Coal Co.	—	—	†90	—
St. Nicholas Coal Co.	—	—	1	—
Cambria Iron Co.	17¼	16⅞	17¼	1400
Crane Iron Co.	—	—	46	—
Emaus Iron Co	—	—	—	—
Pennsylvania Salt Manufact. Co.	—	—	79	30
Total shares sold				48,687
Sales for the week previous				83,392
Decrease				34,705

* Ex-dividend of $1 per share. † Asked.

BONDS.

	Sales.	Price
H. and B. T. RR. 1st mortgage, 78	—	— @109
" " " 2d " "	—	— @102
" " " 3d " cons	35,000	63¼@ 65
Lehigh Valley RR. Con. mtg. 6s, Reg	26,000	59 @ 99⅞
" " 7s, 1910	1,000	— @113⅛
" " 6s con	6,000	104¼@104½
Pennsylvania RR., 1st mtge. 6s	4,000	— @104
" gen. " cou. 1910	—	— @101¾
" " gen. " 6s, reg.	6,000	104⅛@104⅜
" " Cons. M. 6s Reg.	—	— @ 97½
Phil. & Reading RR. 7s '93	—	— @110½
" " G. M. 7s, reg. & cou.	—	— @110
" " " " Deb. 6s	500	— @ 82
" " new convertible 7s	18,600	— @106
Phil. & Reading C. & I. Co. Deb. 7s	9,000	83¼@ 84
" " Tamaqua tract	6,000	— @ 88
" " Mtge. 7s	1,000	— @ 89
Lehigh Coal & Nav. Co., 6s '84	6,800	103½@104
" " " RR., '97	—	— @104¾
" " " Con m. 7s	—	— @102
" " " Convt. gold, '97	4,500	104¼@105
Penn. Canal, 6s	—	— @ 70
Penn. and N. Y. Canal, 7s	—	— @108
Ches. and Del. Canal, 6s	—	— @ 88
Susquehanna Coal Co. 7s	—	— @ 85
Buck. Mount Coal Co. 6s	—	— @ 97¼
Penn. Gas Coal Co. 6s	—	— @100¼
Total amount of sales	$124,400	

Closing quotations, in the absence of sales, represent the latest prices bid.

Gold and Silver Stocks,

NEW YORK, Feb. 4, 1876.

With the exception of an advance of $4 per share in Yellow Jacket, and of $3 per share in Alpha Consolidated, mining shares are generally lower.

San Francisco Stock Exchange sales for the year 1875 amounted to 8,287,000 shares, divided among 180 different mining companies. The average value of these stocks for this period was about $38.65 per share.

MINING NOTES.

The California Mining Company's annual report shows the receipts to have been $483,000, from which amount $453,000 was obtained from ores sold. The mine has been carefully opened during the past year, the levels running into the Con. Virginia on the south, and Ophir on the north. The C. & C. shaft is intended to reach the 1,500 level, having already been carried to a depth of 988 feet, requiring about 280 feet more to reach the 1,500 level, and will then increase the hoisting capacity to 2,000 tons per day.

The *Belcher Mining Company's* annual report shows a bullion product for the year 1875 of $3,383,874. The cash on hand January 1st, amounted to $478,712. The ore reduced aggregated 34,117 tons, the average yield of which was equal to $28 43 per ton. The present product of this mine is 450 tons per day.

Raymond & Ely reports a bullion yield of $738,306 for the year. They carry forward a liability balance of $109,500.

The *Justice Mine* goes steadily ahead at the 400 and 600-foot levels, the daily yield being about 30 tons per day, which is being reduced at the Spring Valley mill. The stock of this company is firm at $28 per share.

The *Leopard Mining Company's* total shipments of bullion from October 14 (from the completion of their new mill) to December 31, 1875 amounted to $226,879 89.

Manhattan Silver Mining Company, Austin, Nevada.—The production of bullion by this company, during the year 1875, was valued at $1,206,038.25, an average of over $100,000 per month, which is considered a very large yield with a single mill of twenty stamps. The number of tons of ore crushed in the mill of this company during the year amounted to 6,524 and a fraction. This would bring the average yield of this company up to nearly $18.50 per ton.

The Sutro Tunnel had progressed 12,037 feet for the week ending January 22d; the present average rate of progress of this work amounts to from 70 to 80 feet per week. Within two months the engineers expect to reach a ledge of ore. An assay office is now being constructed, and assays of rock will soon be begun. The proposed total length of the tunnel is 19,800 feet, and it is confidently expected that it will be completed by March, 1878.

QUOTATIONS:

	No. of shares.	Jan. 27.	Feb. 2.
Sierra Nevada	100,000	$23	22
Union Consolidated	100,000	10	10
Mexican	108,000	20	19
Ophir	108,000	64	59
California	540,000	89	83
Consolidated Virginia	108,000	447	422
Best & Belcher	120,900	65	59
Gould & Curry	108,000	24	21
Savage	112,000	24	20
Hale and Norcross	16,000	65	54
Chollar Potosi	28,000	95	95
Alpha Consolidated	30,000	21	24
Imperial	100,000	9	9
Yellow Jacket	24,000	95	99
Kentuck	30,000	13	13
Crown Point	100,000	24	23
Belcher	104,000	34	31
Overman	38,400	67	65
Caledonia	20,000	32	31
Justice	105,000	28	28
Raymond & Ely	30,000	20	20
Meadow Valley	60,000	3	3
Eureka Consolidated	50,000	16	16
Eureka G. V.	20,000	3	3
Silver Hill	54,000	11	12
Julia	110,000	16	15

Copper Stocks.

Specially reported by Messrs. WILSON W. FAY & Co., Bankers and Brokers, room 7 Traveller Building, 31 State street Boston.

BOSTON, THURSDAY EVENING, Feb 3, 1876.

The week closed with very little animation in mining stocks. Allouez firm at 22¼, sales being effected at 23. Calumet and Hecla declined during the week to 168¼.

but has since rallied, closing 169½, bid, $5 per share off. Copper Falls is strong—4.00 bid. Franklin is firm at 14¾, bid, with sales at 14⅞. National is a trifle weaker at $3 asked. Pewabic is very strong at 5¾ bid. About 250 Quincy has been sold during the week from $42 50 to $42, dividend off, and closes $42 bid. Ridge is weaker, having declined from $6 50 to $6, a sale of 50 shares having been made at the latter price to-day. It is said the mine will not pay the dividend of $1 per share which has been expected. Eastern has fluctuated between 13¼ and 15, closing 14 bid.

The *Northwestern Mining Journal* states that "the product of the Osceola Mine, for 1875, was as follows:

	Lbs.
Barrel work	4,100
Stamp work	1 774,640
Total lbs Mineral	1,778,740

Company's share of tribute 1,290 lbs. ingot.

The increase of mineral product over that of 1874 amounts to 260 tons."

The Cleveland Silver Mining Company has levied an assessment of 30c. per share for February.

DESCRIPTION.	Par Value.	No. of Shares.	CLOSING. Bid.	Asked.
Allouez	$50	20,000	$22 50	$23 00
Calumet and Hecla*	20	80,000	169 25	170
Central	25	20,000	30 00	31 00
Copper Falls	25	20,000	4 00	4 25
Dana	25	20,000	15	19
Duncan Silver	20	60,000	1 38	1 50
Franklin	25	20,000	14 75	15 00
Humboldt	25	20,000	25	30
Madisca	25	20,000	25	30
Mesnard	25	20,000	63	70
Minnesota	25	20,000	2 75	3 25
National	15	20,000	2 88	3 00
Petherick	25	20,000	60	65
Pewabic	25	20,000	5 75	6 25
Phenix	25	20,000		
Quincy*	25	20,000	42 00	42 50
Ridge	25	20,000	5 75	6 25
Rockland	25	20,000	35	40
International Silver	—	—	—	—
Star	25	20,000	37	40
Superior	25	20,000	17	20
Eastern RR			14 00	14 25

*Ex-dividend.

Gas Stocks.

NEW YORK, Feb. 4, 1876.

New York City gas stocks are generaly steady and in fair demand; the tendency, however, is to lower prices, any changes which we make in our quotations being in that direction.

The stocks of the Brooklyn companies are very weak and pressing on the market with scarcely any demand. We alter some of our quotations of these stocks, $15 and $20 per share below prices ruling in our last.

A resolution has been introduced into the Board of Alderman, of Brooklyn, directing the Board of City Works to advertise for proposals for lighting the streets of the city and public buildings with oil, or other substances, including the cost of changing and arranging the lamps and burners for that purpose. The resolution was referred to the Committee on Gas.

A member of the New York Assembly has introduced a bill into that body which provides that the Mayor and Aldermen shall appoint a Meter Inspector, and he shall appoint three deputies, two to reside in the Western District and one in the Eastern. Their compensation is to be fixed by the Mayor and Common Council. The price of gas is fixed at two dollars per 1,000 cubic feet. Provisions are made for requiring the gas to be of a certain quality.

If the gas companies had reduced the price of gas some time ago, as we advised, they would have headed off much of the opposition they are now meeting with, and would have been able to retain most of the business they are now losing.

The Jersey City Gas Company has reduced the price of gas to $2 75 per thousand feet, and the Hoboken Gas Company to $2 75 per thousand feet. It is rumored that the Newark and Citizens Gas Company, of Newark, N. J., have also reduced their prices.

The coupons on the bonds of the Peoples' Gas Company of Brooklyn, are due during the present month. The Citizens' Gas Company of Brooklyn, will hold its annual meeting on the 8th inst.

Semi-annual dividends of the following Massachusetts Gas Companies, are due and payable on February 1,: Cambridge Gas Company 5 per cent., amounting to $35,000, Jamaica Plains Gas Company, 4 per cent., amounting to $7,800; Lawrence Gas Company, 5 per cent., amounting to $20,000; Newton and Watertown Gas Company, 5 per cent., amounting to $10,000; South Boston Gas Company, 3 per cent., amounting to $13,200 (this is a reduction of 2 per cent. from the dividends usually declared by this company). The Chelsea Gas Company paid a 4 per cent. dividend on the 15th of January, a reduction of 1 per cent. from the previously declared dividends of this company. The Charlestown Gas Company has declared a dividend of 5 per cent., amounting to $25,000, payable on demand.

Sales of the stocks of the following companies, are reported to us for the week at the prices annexed: Malden and Melrose Gas Light Company, at 91, ex-dividend; East Boston Gas Light Company, at 32¼, ex-dividend; South Boston Gas Light Company, at 116½, ex-dividend; Dorchester Gas Light Company, 96 and 96½, ex-dividend; Citizens' Gas Light Company, of Wakefield, at 57½ to 60; Lynn Gas Light Campany, at 101⅜, later at 100.

The San Francisco Gas-Light Co disbursed an aggregate of $800,000 in dividends during the past year, in regular monthly payments of ¾ per cent. We note very recent sales of the stock of this company, amounting to nearly 600 shares at from 95 to 97. We also note sales of nearly 800 shares of the People's Gas Co., of Baltimore, at 26¾; also 170 shares of the Montreal Gas Co.'s stock at from 137 to 138.

The Washington Gas Co., of Philadelphia, has its dividend period during the present month.

The city of Chicago, Ill., paid the two gas companies of that city during the year 1875 $584,094.95, of which amount the Chicago Gas Light and Coke Company received $268,276.36, and the Peoples' Gas Light and Coke Company $315,418.59.

The Connellsville Gas Coal Company will hold their annual meeting in Philadelphia on the 7th inst.

Mines, Metals and Arts, of St. Louis, says:—"The consumption of gas in the City of St Louis is very nearly 500,000,000 cubic feet annually, all the coal for which is supplied from the Monongahela.

"The St. Louis Gas-Light Co. manufactured for distribution for the year 1875, 280,000,000 feet against 259,000,000 for 1874. It supplies 3,500 city lamps at a cost to the city of $25 per year per lamp.

"The Laclede Gas Company supplies 3,000 public lamps at the same rate of compensation annually. Its year's make of gas was 180,000,000 cubic feet for 1875. Or, 460,000,000 cubic feet for the old companies, while the gas production of South St. Louis Gas Company will bring up the total for the year to 500,000 cubic feet. The price of gas to the public is $3.25 per 1000 feet.

"The following is a near approach to the actual increase in consumption of gas for the past four years from the old companies:

	Feet.
1875	500,000,000
1874	420,000,000
1873	400,000,000
1872	380,000,000
Total	1,700,000,000

"A contest in the courts, between the city on the one hand and the St. Louis Gas Light Company on the other, developes the following as the assumed profits of that company during the past six years:

Years.	Amount of feet of gas sold.	Net profits.
1870	275 000,000	$825,000
1871	325,000,000	975,000
1872	380,000,000	665,000
1873	400,000,000	700,000
1874	420,000,000	735,000
1875	460,000,000	805,000
Total profits for six years		$4,705,000"

Quotations "bid" and "asked" of New York City and Vicinity Gas Companies are on the $100 of stock and not on one share.

Companies out of Town.†	Cap. Stk.	Par	Bid	Askd.
People's " " of J. C.			125	135
Citizen's G. L. Co., Newark, N.J.	1,000,000		75	80
Hempstead" " L. I., N.Y.	40,000	100		100
Jamaica, " " " "	25,000	100		100
Richmond Co., S. I. "	300,000		100	105
Citizens', Rochester, "		100	60	68
Rochester Gas Co., "		100	50	
People's G. L. Co. Albany,"	1,000,000	100	31	40
Mutual " Buffalo "	750,000	100	55	60
Mutual " Detroit Mich.		50	18	—
TroyG. L. Co., Troy, N. Y.			108	
Brockport, N. Y., G. L. Co.	25,000	100		80
Baltimore G. L. Co., Balt., Md.	2,000,000	100	185	
People's G. L. Co., Balt., Md	2,000,000	25	26¾	—
Hannibal G. L. Co., Hanni., Mo.	100,000	100	95	100
La Clede, Mo				123
Lewiston G. L. Co., Lewis., Me	400,000	100	33	
Chicago G. L. Co., Chicago, Ill.	2,000,000	100	140	
Jacksonville, Ill.	120,000	100	82	
Lima, Ohio	60,000	100	10	
Derby G. L. Co., Derby, Conn.	160,000	100		80
Woonskt G. L. Co. Woonskt, R.I.	150,000	100	100	
Fort Wayne G. L. Co. F. W., Ind		100		105
North. LibertiesG. L. Co. Phila.		25	29	
Wilkes-Barre G. L. Co W. B. Pa.		50	70	
Washington G. L. Co., Phila.			42	43
Pottsville, Pa. Gas Co		50	40¾	
Portland G. L. Co. Portland, Me	350,000	50	72	75
Hartford G. L. Co., Hartford, Ct	700,000	25	45½	
Boston G. L. Co., Boston, Mass.	2,500,000	500	775	—
Chelsea G. L. Co. Chelsea, "	300,000		139	
Cambridge G. L. Co., Cam., "	700,000		132¾	
Louisville G. L. Co., Louis., Ky.			127	
Cincinnati G. L. Co, Cincin, O.				200
*St. Louis G. L. Co		50		160
*Laclede G.L. Co., St. Louis, Mo.		100		110
Carondelet G. L. Co., Mo		50		6¼
S. F. G.L. Co. San Francisco, Cal	10,000,000	100	95	97
*City G. L. Co. Montreal, Can.	1,440,000	40	137	138
*Consumers G. L(old.)Tor., Ont	600,000	50	132	
Hamilton G. L. Co., Ont.	150,000	40	112½	
Halifax G. L. Co., Halifax, N.S.	400,000	40	148	150

† These quotations represent the latest obtainable prices at which sales were made.

* These companies pay dividends equal to 10 per cent. per annum.

The following list of Companies in New York and vicinity are corrected weekly by GEORGE H. PRENTISS, Broker and Dealer in Gas Stocks, No. 30 Broad st., N. Y.

Companies in New York and Vicinity	Cap. Stk.	Par.	last Div.	When Paid.	Bid.	Askd.
			pr.c			
Mutual, N. Y.	$5,000,000	$ 100	2½	Oct. '75	109	110
" " Bonds	900,00	1,000	3½	Aug. "	105	107½
NewYork, "	4,000,000		5	Jan. '76	151	152
Metropol. "	2,500,000	100	5	Sept. '75	160	161
" " Certf.	1,000,000		3½	" "	105	106
" " Bonds	500,000	1,000	3½	July, "	105	
Harlem "	1,850,000	50	4	Feb. '76	132½	135
Manhattan"	4,000,000	50	10	Jan. "	300	303
Brooklyn, B'klyn.	2,000,000	25	5	Nov. '75	210	212½
Nassau "	1,000,000	20	4	July, "	100	109
" " Certf.	700,000	1,000	3½	Nov. "	95	98
People's "	1,000,000	10	3½	Jan. '76	77	81
" " Certf.	300,000	1,000	3½	July, '75	83	86
" " Bds	325,000		3½	Aug. "		100
Metropol. "	1,000,000	10	3½	May, "	70	80
Wmsburgh "	1,000,000	50	5	July, "	140	145
" " Certf.	1,000,000		3½	July, "	100	101
Citizen's "	1,200,000	20	2½	Jan. '76	105	112
" " Certf.	320,000	1,000	3½	Oct. '75	100	101
J. C. N.J.	386,000	20	5	July, "	160	170
Centl. Westch. N.Y.	466,000	50	4	July. "	100	105

‡ Gold.

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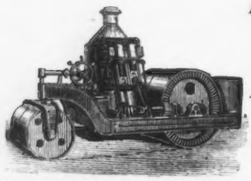

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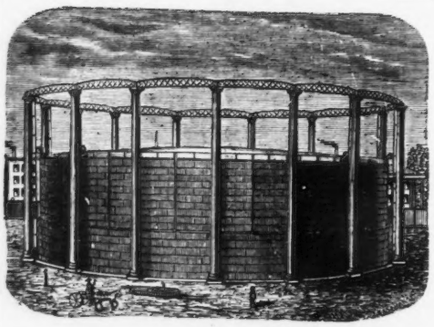

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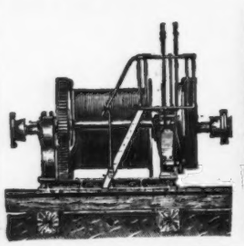

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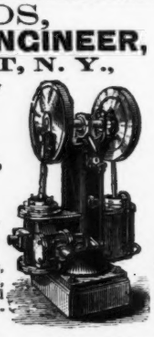

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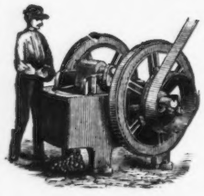

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